FEBRUARY, 1947

Industrial FINISHING

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Industrial FINISHING

W. H. ROHR, Editor P. C. BARDIN, Associate Editor

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What Cuts Cost—An outstanding characteristic of 1947 will be an intensified drive by U. S. industry to increase its productive capacity and cut costs with better machines, according to William L. Batt, president of SKF Industries, Inc. Mr. Batt declares that, "by the middle of 1947, this new, efficient machinery should begin to appear and start working to lift America's productive capacity and to help manufacturers in their battle against rising costs.

"It is only through continual modernization of our productive equipment, so as to produce goods at lower costs, that this nation has been consistently able to advance standards of living for all of its people," Mr. Batt continued.

* * *

Buyers' Market Welcome—In a year-end statement, Mr. James S. Knowlson, President of Stewart-Warner Corp. said:

"The probable readjustment to a buyers' market is not a matter of deep concern to our company. In fact, a 'buyers' market', to any manufacturer operating on the simple theory that 'no one ever went broke giving people what they want' offers a challenge and opportunity not to be found in a 'sellers' market'. For, it is then that all of a company's experience and dexterity in creating wants through advertising and merchandising, meeting them through design and production efficiency, and harvesting the profit crop thus sown, through skillful selling, can best be coordinated. The company that is lulled by the false security of a 'sellers' market' can too easily forget product perfection and the creation of new markets. Stewart-Warner has not been so lulled."

* * *

Better Paint Brushes — Real Chinese hog bristles for paint brushes (which during the war were imported with great difficulty with the aid of air transportation, and, in the longer lengths, strictly reserved for the use of the armed forces) are again entering the normal channels of commerce. How successful they will be in competing with Nylon, Neoceta and perhaps some other kinds of synthetic bristles, remains to be demonstrated.

In a recent address at the convention of the American Brush Mfrs. Ass'n., Isidor A. Rubin paid high tribute to the Chinese for the part they played in securing and dressing the millions of pounds of bristle which were shipped to this country during the war years and used in paint brushes for the armed forces. An interesting factor in this data is that, of the total imports of 1,398,802-lbs. of Chinese bristle for the entire year of 1945, practically one-third reached this country from Russia.

(Continued on page 10)

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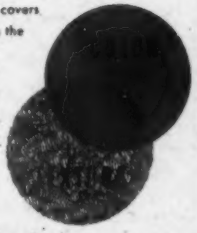

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Rubber Drying Pad—Rubber capable of conducting heat has been used by Goodyear Tire & Rubber Co. in producing a huge ink drying pad. The pad is 30-ft. long, 65-in. wide, weighs 187-lbs., and is said to be the largest rubber heating unit ever made for industrial purposes. It will be used in the fabric printing industry for drying multiple colors of ink in one operation. Perhaps, with modifications, such a unit may be used in finishing rooms of the future.

* * *

Schools of Selling—The National Retail Furniture Association conducted a school in 111 cities in 36 states during 1946. Classes were attended by 16,714 retailers and their sales people. More attendance is expected in 1947. This is a good sign. Mr. James P. Oliver, association merchandising division manager struck the keynote when he said, "With women daily becoming more color and quality conscious, wartime sales psychology must be abandoned if the dealer is to survive."

The National Retail Lumber Dealers Association began a 30-day course on January 6 at the New York State College of Forestry of Syracuse University. Subjects covered included merchandising of lumber and lumber products, and a study of grades. A similar course is planned at a later time at the University of Michigan. The National Association of Lumber Manufacturers is cooperating.

These schools will prove highly beneficial to those who attend, and they should point the way for other groups—and even for individual manufacturers—to provide the means of more knowledge and greater understanding among

people who will eventually have to sell goods.

* * *

What a Man's Good For—A crystal ball is not needed by industrial management to determine whether a man will make a good salesman or office worker, or plant foreman. Aptitude tests are all revealing. The army used these tests during the war, with the result that sometimes a civilian truck driver became an army cook or baker, and a good one too. No test is 100% perfect, but personality traits are revealed, social intelligence is measured and occupational interests are indicated. All of these could be learned by trial and error, at considerable expense to management and time wasted by the employee. Scientific tests are available to progressive manufacturers who want to know more about those they hire, before they hire them.

* * *

An Aluminum Boat, being built as an experiment at an Oyster Bay shipyard, is nearly completed. The hull of the 35-ft. sloop-rigged yacht is ⅛-in. thick with aluminum beams, girders for keel, ribs and other frame members. No riveting problems have developed. Boat enthusiasts are hopeful that the experiment will prove that aluminum alloy is suitable for small boats, and that mass production will be possible. Fine woods normally used in boats are becoming increasingly scarce and consequently more expensive, whereas aluminum costs are diminishing.

* * *

Plastic Covered Wire that is pliable and which will stay bent in any shape indefinitely, is now

(Continued on page 74)

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Painting Truck Trailers In

View inside 75-ft. down-draft spray booth where workmen are spraying the fina coat of paint. Stationary and swinging platforms at the side enable spra operators to stand on any one of three different levels while spraying bodies On each side of the entrance and evenly spaced at three elevated locations alon each side, are hose connections for compressed air and paint, complete wit pressure regulators and gauges; pressure tanks are outside the booth.

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After

...In a Production Line

Assembling, cleaning, spray painting and forced drying of all paint coatings are now on an efficient line production basis in the modern plant of Fruehauf Trailer Company in Los Angeles, California.

By FRED M. BURT

SPRAY-PAINTING and force drying units that are entirely new and also specially engineered are included in the continuous production line at Los Angeles plant of Fruehauf Trailer Co. of California. The assembly and paint lines are part of an expansion program which has added large areas, new layouts and equipment of diversified type for the mechanical handling of all assemblies that enter into the finished product.

The Fruehauf Aerovan, made in lengths ranging from 20-ft. to 34-ft. is designed for a variety of transportation uses. These large truck trailers, with net payload capacities up to 42,000-lbs., have all-welded, steel frames. They have interior linings of corrugated aluminum, and outer side and end panels of duralumin. The 22-gauge electro-zinc-coated sheet steel roof receives a coating of aluminum paint.

To give some idea of how the surface preparation, painting and paint drying fit in with other operations on this 1100-ft. production line, I will describe briefly some of the assembly work.

Metal Assembly Work On Continuous Production Line

In the frame department, chassis side rails and cross members, along with other sub-assemblies, are put together in large jigs and welded. Then the floor supports are added. This area is served by overhead monorail conveyors, traveling bridge cranes and hoists.

After leaving the assembly jigs the units move in a single line through stations for the installation of tubing and wiring, axle and spring assembly and other under-body construction. They travel upside down on a wide roller conveyor, being pulled by a slow-moving chain in the center. Near the station where wheels are hung there is a spray booth containing special equipment for holding and rotating wheels to be spray painted.

When the chassis assembly is completed each unit is lifted up, turned over and set right side up on its wheels beside the conveyor. Each trailer is then centered over a chain which travels in a slot in the floor, with guard rails on either side. Side and top skeleton frameworks are transferred from nearby jigs to the chassis, clamped on and welded. Rear doors are attached.

As the units move forward slowly by power, any cleaning of the chassis that is required, pre-

Outside of 75-ft. final spray booth. Exit is at left. Notice farther at left one of the three exhaust fans that pull off-spray away from interior of booth and through water wash system. Each of the lamps is 500-watt.

paratory to painting, is done manually with sandpaper or solvent or both.

A coat of red chassis paint is sprayed on in the 40-ft. chassis spray booth. In this booth, as in all others, the paint is supplied to spray guns from pressure tanks. Compressed air for spraying comes from a centrally-located compressed air supply.

Chassis Spray Booth; Water Wash Exhaust

The chassis spray booth is 16-ft. wide and 12-ft. 8-in. high. It has two 20-ft. water wash units in staggered arrangement. The first one is on the right side and the other one is on the left. The 125-f.p.m. average face velocity of air across the working areas quickly pulls all off-spray into the water curtain of the booth. Illumination—unnecessary in bright daylight—is supplied by 16 500-watt incandescent lamps, in vapor-proof reflectors.

Adding Sides, Fronts, Roofs and Hoods

As the trailers move slowly (14-in. per minute) out of the chassis booth they pass along work stations where the side and front end panels are put on. Then they move along between high level platforms where a roll of full-width sheet metal roofing is let down from above and unrolled over the roof framework. At the same time, inside the trailers, wood flooring is being installed and other interior work is being performed at this and successive stations.

After passing through an open area, the trailers again pass between elevated platforms where a compression jig is lowered onto the single sheet of roofing. The sheet metal roof is pressed into place by formed clamps and nailed firmly to the roof framing. Side moldings are attached with screws. Front and rear caps and decor-

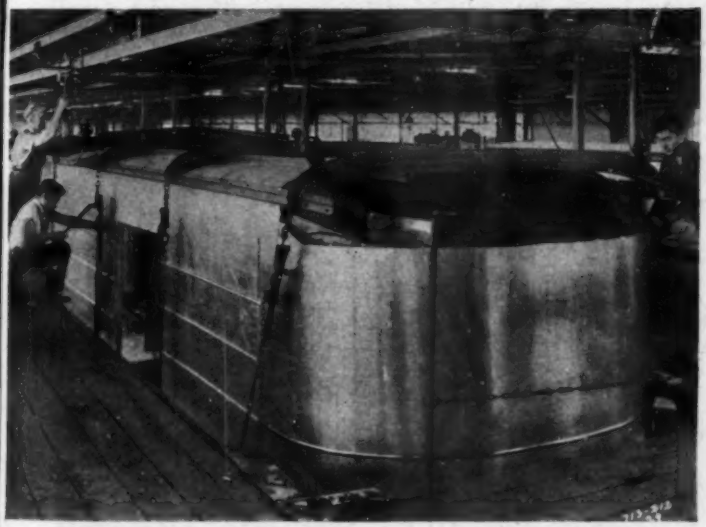
ative wings are positioned and attached with molding, bands and screws. Side doors are hung and other outside work is performed.

Final Cleaning of Body In Preparation for Paint

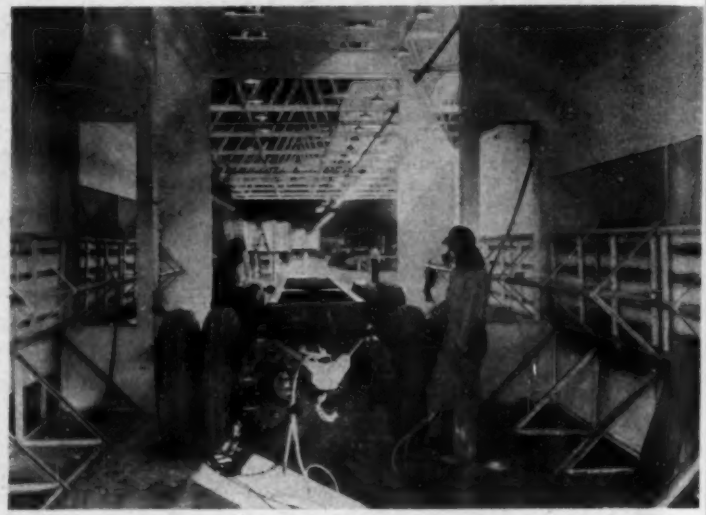
Trailers pass between cleaning scaffolds where workmen clean off rust spots, shop dirt and any other deposits with abrasive paper. All bare metal areas to be painted are wiped with clean cloths wet in solvent. This cleaning is followed by a similarly applied treatment with a special acid solution which lightly etches the duralumin to promote better adherence of the primer coat of paint.

As the trailer bodies enter the main spray booth, a fast-drying coat of reddish-brown primer is sprayed on. This is followed by two coats of color. The whole body painting job can be completed in about 45 minutes or less. For most of the spray painting on sides and top, the trailers are disengaged from the conveyor chain, but for spraying fronts and back ends the spray-painter rides a special ladder which is mounted on wheels and pulled along by the conveyor chain.

At the exit end of the long spray booth wherein the final painting is performed, there is a stationery platform at a constant level, but on this platform there are swinging platforms which enable spray painters to stand on two higher levels. This spray booth is 75-ft. long, 18-ft. wide and 18-ft. 10-in. high. Openings at each end are 10-ft. wide. It is illuminated by seventy 500-watt



A peek at some of the final assembly work. Here the single sheet metal roof is being clamped into position over the bow-roof frame work. Parts to be added to close the openings in roof at each end are called "hoods."



Special water wash spray booth (alongside the baking oven) for painting stake and rack trailer chassis, converter gears and other special units. This is practically a duplicate of the chassis spray booth. Note the staggered arrangement of the two 20-ft. water wash units—on the right in the foreground, and at the left in the background.

incandescent lamps—28 on each side and 14 above. The light passes through wire glass windows so that no off-spray can settle on the lamps. Deposits on the windows are easily removed by wiping with a cloth wet in solvent.

Removal of Off-Spray From Spray Booth

Within the spray booth off-spray is removed by a strong down draft through the 3-ft. wide grill which extends lengthwise along the middle of the floor. The spray booth is divided into three 25-ft. sections, with the down draft in each section provided by a heavy duty exhaust fan. When a trailer body is in the booth there is a down draft of about 150-f.p.m. velocity.

In each section, the off-spray, after passing down through the grill, is pulled to one side, passed through water sprays and then through eliminators where the last vestige of off-spray is removed. All of the water that carries away off-spray flows down into a 2200-gallon tank for re-circulation. Conditioned water is recirculated through the washing units by three pumps located in the pits.

Fire protection for each spray booth includes two rows of automatic sprinkler heads overhead and hand-operated, foam-type fire extinguishers which hang at several convenient points.

A short distance beyond the main spray booth is a paint baking oven designed and built for trailer bodies. It is 70-ft. long, 11½-ft.

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A peek inside the 70-ft. long paint baking oven; exit end is in foreground. At the inner edge of the vertical duct at left, on the end of the oven, there is a vertical slot from which hot air is introduced into the oven to form a heat seal. Duplicate units are on the other side of this door, and at the other end of the oven. Notice rows of small ducts at upper left; and larger ducts pointing downwards, from which hot air is ejected.

wide and 16-ft. high. Originally designed to have doors on each end, the inconvenience that doors would cause has been eliminated by using a heat seal on each side of each end. Hot air under high pressure is introduced into vertical ducts at each location. From a narrow slot on the inner edges of the ducts, hot air is projected at an inward angle toward the center line. The two sheets of hot air meet to form a "V" with its apex pointed toward the oven interior. This heat seal prevents the escape of hot air, so that just outside the oven ordinary room temperature prevails.

Hot air is also introduced through rows of small ducts on each side, just below roof level, and a lower level through slots in the lower edges of the longitudinal ducts. Oven air is drawn out through ducts close to the floor, for re-circulation through the heater. Supplementing the re-circulated air is a certain amount of fresh air from outside openings. The oven exhaust fan is operated by a 2-hp. motor. A larger blower, driven by a 7½-hp. motor, supplies air to the heater which is of the indirect type. Four gas-fired burners shoot their products of combustion into refractory-lined burning chambers, around which the air to be heated circulates rapidly. The complete unit is designed for an hourly heat input of 2,500,000-B.t.u's.

The whole oven operation is automatic. Conditions within the oven are predetermined by settings on a large control panel and switchboard. The volume and velocity of air and the heat input are maintained in a constant efficient ratio. Two recorder controllers attached to thermocouples inside the oven, show by their charts that the air from the heater for input is kept at from 270° to 300° F., and the temperature of air in the upper central part of the oven is kept at from 179° to 188° F.

Progressive Inspection; Touch-up Station

The trailer production line ends at a "touch-up" station. All the way down the line, trailers are subjected to a progressive inspection, with one inspector assigned to a relatively few successive operations. As each trailer passes from each inspection area it is expected to be in perfect condition for succeeding operations. There are several places where a trailer

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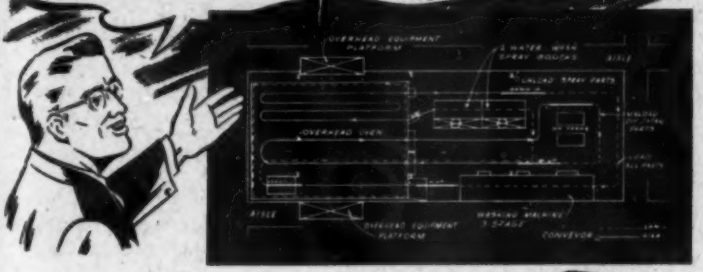

More and more manufacturers, faced with problems of production, cost of operation and limited space, are consulting KOCH engineers . . . and coming up with the answers to their problems.

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can be taken from the line, if necessary, for extra work. A modification and re-work area parallels the production line, starting opposite to where the body cleaning is done.

Additional Spray Booths For Special Work

Near the baking oven, there is another 40-ft. water wash spray booth, which is an approximate duplicate of the chassis spray booth. It is used for painting stake and rack trailer chassis, converter gears, and special jobs.

Another 40-ft. spray booth is being constructed to paint the heavy duty "carryalls," logging and pole dollies and other units manufactured in an adjoining building. It is of the same design as the 75-ft. downdraft booth.

Still another booth of this type will be used by the Sales and Service Department, at another location. Operations in this latter booth will include such work as striping, lettering and other decorative work performed according to customers' specifications. Here there will be masking and spraying of the desired colors, and some special work by an artist. In a former setup this decorative work was performed at the main plant, but with greatly increased activity it is considered as custom work which should be handeled in a different working area.

The setup in a water wash booth for spraying wheels. The top roller is counterbalanced and can be raised and lowered. The rear bottom roller is power-driven; it can be started and stopped by pressure on a pedal.

Experimental Research Dept. Put in by Nax-Dar Co.

The Nax-Dar Co. of Chicago announces the organization of a new experimental research department to advance the progress of the silk screen industry. This new department will be headed by Elmer Kortum, formerly manager of Nax-Dar's photographic department, a veteran with many years of experience in silk screen work, and well known throughout the industry.

Mr. Kortum's Research Department will work on such problems as improving silk screens, developing new accessories and methods of producing better work faster, screens that will last longer, and a new line of wood grain screens.

The Nax-Dar Co. is installing considerable expensive equipment to facilitate the work of the new Research Department, and the results of its labors are expected to be of great benefit to the entire silk screen industry.

Burdett Doubles Production Capacity in New Plant

Sharply increased sales of infra-red gas burners has resulted in Burdett Mfg. Co. moving to new and larger quarters at 3433 W. Madison St., Chicago, Ill.

According to company officials, the recently doubled production capacity is the first phase of a broad development program to include extensive research on new and improved applications of infra-red gas heat, as well as fundamental research on the basic infra-red principle. Additions to the engineering staff have been made.

Photograph courtesy of DeVilbiss Co.

Conditioning the Water For Wet Spray Booths

By Samuel J. Miller, Ch. E.
Chemical Director, The DuBois Co.

Why chemical compounds are used in the water of water wash spray booths, how much to use, how often to drain out all water and replace it with renewed charge, how to know if the treated water is right, and who to consult for more specific information on this.

ANYONE who has occasion to observe a large number of spray painting operations is immediately impressed by several things. First, probably, is the fast but excellent job of beautifying various products by coating them with materials that are pleasing to the eye. Millions of spray-painted articles from America's factories have a beauty of color and texture which far

surpasses that of many objects of art displayed in our fine museums.

Another point that will arouse the admiration of the observer is the obvious competence and unusual interest of most key workers in the spray-painting department. For some reason, spray painting operations seem to fascinate workers, from top supervision right on down the line. The work arouses keen technological and even æsthetic interest on the part of all who see it.

Use of Agglomerant in Water Wash Booths

It is precisely because of this unusual interest that it has been possible for all concerned to work together so effectively for the improvement of the whole spray-painting operation. My direct and immediate interest of course, is with the use of agglomerants in the water of the booth and masks on the dry areas. In working out the best materials and methods for such operations, it is necessary to consider various operational components, some of the most important of which are:

1) Control of agglomerant solution concentrations;

2) Elimination or control of foam;

3) Periodic cleaning (chemical or physical or both) of both wet and dry parts of the system;

4) Removeability of dried overspray;

5) Frequency of renewal of agglomerant solutions.

All of these points, and certain others too, can stand the further study which they are now receiving in our own laboratory—and probably in others as well. But the problem of how often the agglomerant solution should be emptied, and the reservoir cleaned and refilled with new solution—this matter has received scant attention and it still remains a debatable question.

I have in mind two large spray painting operations which I visited recently, as consultant. I went there to aid in the elimination of certain existing difficulties. The two operations were similar in the type of work being done and the finishes being used. Both were well managed companies, with excellent engineering departments. They were located in the same city, used city water—and I visited them on successive days.

Extremes in Frequency of Draining and Recharging

In the first plant, my question as to how often the agglomerant solution was changed, brought out the fact that they drained the used water to the sewer and recharged after each 8-hour shift. In the second plant, operating 16 hours a day, the procedure is to drain and refill only twice a month. In other words, the first plant has a recharge schedule about 30 times as frequent as that of the second plant.

Now it is improbable that either of these extremes represents the best conditions from every point of view. In both of these factories, a recharge frequency somewhere between these two extremes (although closer to the low figure than the high) did, in fact, prove superior when put to an actual test.

Because of the fact that this uncertainty about proper renewal frequency rates is so general, and the factors which ought to serve as determinants in any given installation are not always clearly perceived, I have felt that it would

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be profitable to use this article for at least a cursory examination of those factors.

In this article therefore, I plan to look at these factors and will hazard some opinions regarding them, but I will not be arbitrary or dogmatic, for there are already in the world too many people who "know too much that isn't so." Even large operators are in sharp disagreement on these matters as is evidenced by the process specifications of two of the largest spray-painters in the country. Their own specified requirements of alkalinity, soil loading, change frequency and like factors differ from each other by as much as 60%, although the operations are essentially identical.

To avoid profitless debate about nomenclature, let me say that I prefer to use the vigorously descriptive word "agglomerant" to mean "water-wash compound." Granted that no single physical action, such as agglomeration, can comprehensively describe the total functioning of a water wash compound, nevertheless I feel that the word "agglomerant" comes close enough to being a complete description that it should be a useful addition to the lexicon of spray-painting.

Factors That Influence Water Wash Treatment

The actual basic factors involved in determining how often to empty and refill the water system in a wet spray booth are, in my opinion, few. The criteria by which these factors can be determined are numerous. The factors, I should say, are these:

1) Booth performance;
2) Labor and production cost of booth cleaning;
3) Cost of the agglomerant used.

Obviously, the spray booth has to work satisfactorily, or nothing else counts. Obviously too, it may be wise to empty and recharge twice as often as at present if this keeps the booth in so much better condition that the total cleaning cost for labor is materially cut down, since the latter cost is almost sure to outweigh the combined agglomerant and water costs.

Granted that the three factors just mentioned do serve compositely to determine how often the tank should be emptied and refilled, how shall we go about rating those factors for a given installation? We must have suitable critera by which to judge, and it seems to me that the ones worth considering in most cases would be as follows:

1) Paint load in the water;
2) Number of hours the solution has been in use;
3) Sludge characteristics;
4) Booth appearance;
5) Wetting or draining tests;
6) Solution conductivity;
7) Solution turbidity;
8) Foaming;
9) Amount and rate of concentration decrease.

Beyond question, there are supplementary critera pertinent to specific operations. Equally beyond question, there are some of the above critera that are not universally applicable. Such things as solution conductivity, for example, may or may not be dependable indicators.

Varying Operational Conditions Inject Other Factors

The whole problem would certainly be simplified if every booth operated hour after hour and day after day on a single type and grade and color of paint; but since, in most factories, this is an

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operational impossibility, there is no use in setting up conditions narrowly for such a job. The matter of paint reclamation has to be borne in mind too.

Really there is no "royal road" in this, any more than in any other field of endeavor. *There is no substitute for the old reliable team of knowledge gained from experience, plus thoughtful consideration of each specific detail of the particular job being studied.*

The critical question, of course, is that of just what the agglomerant does in use, and what if anything happens to it. Is it gradually neutralized by acidic or oleaginous constituents of the paint? Is it being vitiated [made ineffective] by water hardness? Is it decomposing or reverting to relatively inefficient chemical forms, by hydration, aeration, or otherwise? Is it being occluded by the sludge, and to what extent? Is it being lost by entrainment of liquid in the out-going air?

How much is being lost by overflow in the case of tanks equipped with float valves? (This last may theoretically be none, but is often considerable in actual plant practice because of sticking or gumming up of the float, and because a deposit of paint on the float provides a false actuation and maintains the fresh water influx for a longer time than necessary.) There is even a loss, surprisingly frequent, from leaking or from carelessly closed tank outlet valves.

Cooperation Between User and Supplier of Water Compound

All such matters will be carried in mind and given due consideration by the thoughtful manager of a water wash spray booth setup, and by outside consultants whose aid he may request. Working cooperatively, manager and consultant can probably always bring about good job performance. At the same time, both may continue to wonder and to debate about just what is going on in the water. Is the agglomerant acting chemically or physically or electrolytically? Does it enter into a reaction? Is it a catalyst, a synergist, or what? Glib answers aren't worth much in this field, and most engineers admit frankly that there is a great deal still to be learned about the actual scientific mechanism by which a good agglomerant accomplishes its purpose.

My feeling is that we now have a reasonably good understanding of how to adapt the agglomerant to different conditions and difficulties, and thus to bring about excellent performance in use. However, I believe that when more fundamental scientific data can be developed as to the basic "how" of agglomerant functioning, decided benefits will flow to all concerned. It is for that reason that the company with which I am connected has set up an extensive testing program, intended to continue until satisfactory answers are obtained, to study the whole operation from the point of view of fundamental chemistry and physics. Right now the industry is in the favorable position of being able to delineate sharply the area of "things not yet proved," as well as the area of "established facts." That being the case, it can be confidently predicted that proper research will cause the former area to disappear little by little into the latter.

There is one more phase of the subject that is worth at least brief examination. It is the immediate, practical question of just what the buyer and seller relation

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ship ought to be in this connection. To me it has always seemed that this should not be either "buying" or "selling" in the usual (or probably I should say in the formerly usual) sense. Rather it should be a full and frank mutual exchange of information between buyer and seller, with both participants being not only willing but also able to provide or to secure all necessary and pertinent facts.

Suggestions for The User; Suggestions for The Seller

If the buyer is to be served well, then he must be prepared to give the prospective seller all facts about the water system of his spray booths, or to turn such prospective seller over to a department head who is in position to supply this information. Such facts would include not merely the gallonage and other physical data about the system, but should also include an objective and unbiased past history of the operation. For example, what troubles have been encountered, what means have been tried to overcome them, what operational abnormalities must be put up with, and so on.

The man responsible for production should make sure that there will be proper liaison between his laboratory (for control) and production. He should see that final responsibility for this phase of booth operation is centered unequivocally in one competent individual. Especially should he try to bring into the open every question or doubt or criticism, giving the seller an opportunity to answer or allay or refute them—or to take steps toward ameliorating the objectionable conditions, if that proves to be what is needed.

The seller, for his part, owes it to all concerned to be well informed on the subject, preferably through combined field experiences and actual instruction. He ought to know, and to admit directly and without apology, any difficulties that cannot be eliminated, as well as those that can. It certainly profits no one to raise false hopes of specific improvements under circumstances where the conditions of the job render such improvements impossible.

In my opinion the seller is under a definite obligation to continue well-planned laboratory and field experimentation, directed toward improvements of at least his part of the operation. It is as parasitical to "go for a free ride" in this branch of industrial activity, as in any other. Fortunately, such free rides do, as a rule, slow down and stop before too long a time, probably by virtue of their lack of any actually inbuilt driving force.

Monsanto in Texas

Monsanto Chemical Co. announces the formation of a Texas Division of the company, with headquarters at Texas City. Joseph R. Mares is general manager of the new manufacturing unit.

The 50,000-ton capacity styrene plant at Texas City, which Monsanto purchased from the War Assets Administration in August, 1946 for $9,550,000, will form a nucleus for the new manufacturing division. Production of the first polystyrene plastic at Texas City is expected soon and plans already are under way for further Texas expansion.

Industrial Designer Opens Office in Cleveland

Onnie Mankki, A. I. A., announces the opening of an office for the practice of Industrial Design and Architecture at 7113 Euclid Ave., Cleveland 3, Ohio. Mr. Mankki was formerly Vice President and Director of Industrial Design for Designers for Industry, Inc.

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Pre-Paint Treatment Can Prevent Rusting

by ROBERT F. AYRES

Oakite Chemical Research Laboratories

PREPARATION OF metal surfaces for painting has assumed an important and specialized place in industry. To combat the ever-present threat of rust and corrosion, many present-day users of iron and steel have adopted special chemical treatments to clean metal surfaces thoroughly, to create the conditions necessary for a firm paint bond, and to insulate against potential future rust-creepage beneath the paint film.

The necessity for treatments designed to clean metal surfaces thoroughly is easily understood. It is well known that the presence of dirt or impurities between paint and metal leads to subsequent paint failure. Not so obvious, however, is the fact that a thoroughly clean metal surface is not enough in itself. A "water-break-free" surface is no guarantee that an article to be painted is in the best condition to receive the finishing coat.

Manufacturing and laboratory experience have shown that a permanently tight paint bond with the metal requires more than just cleanliness, not only from the standpoint of immediate paint adhesion, but also in regard to future destruction of the bond because of the spreading of corrosion beneath the paint coat.

Reprinted from Oakite News Service

Phosphate Coating on Clean Metal Aids Paint Bond

A pre-paint process extensively used to accomplish these ends involves chemical action on the metal in which a microscopically thin portion of the surface is converted into minute crystalline structure composed of insoluble metallic phosphates, integral with the metal. The protective action of a phosphate coating thus imparted lies, to a large degree, in the extraordinary improvement of adhesion between paint and metal; there seems to be specific absorption between paints and certain types of phosphate crystals. Also protection resides in the ability of the coating to prevent the spread of corrosion beneath the finishing layer.

It must be pointed out, however, that phosphate coatings in themselves, because of their crystalline structure and porosity, do not afford permanent protection against rusting. It is in combination with an organic finish that they exhibit their most valuable properties, acting as a component with paint to form a system which is highly resistant to corrosive influences.

In order to appreciate properly the function of phosphate coatings in preventing the spreading of corrosion beneath a paint film, a brief consideration of the electrochemical theory of corrosion may be

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helpful. This theory, based upon considerable laboratory verification, states that the physical and chemical variations upon a metal surface lead to local differences in potential at numerous points on the surface, resulting in the formation of a multitude of tiny electrical cells which, in the presence of moisture, permits the generation of electric currents from one point to another. Under such conditions corrosive electrochemical action occurs and will continue to spread as long as currents are generated. The conversion of the metal surface into the proper type of phosphate structure will arrest the flow of current and block the spread of corrosion.

Metal Must be Conditioned For Good Paint Adhesion

In addition to the electrochemical phenomena, it has been established by laboratory research that the area surrounding a point of corrosion on a metal surface becomes alkaline, a consequence of the chemical reactions involved when rusting occurs. The creeping of this alkaline area beneath a paint film is a more pernicious source of paint failure than the actual rust itself. An alkaline film on a metal surface effectively destroys paint adhesion. . . .

Painting is not essentially a waterproofing process. Most paint films have permeability and the power to absorb moisture. The reaction of the surface beneath the paint when moisture comes through is all important in determining the durability of the painted article. While the quality of the organic finish applied to a metal article is of prime importance in determining its durability under service, it is also a fact that the condition of the metal surface upon which the paint is applied more often determines resistance characteristics than does the paint itself.

Phosphate Coatings Resist Rust and Corrosion

That these facts are now widely recognized is emphasized by the part which phosphating played during the recent war. In the vast production program of war materials, practically every Army and Navy specification required the deposition of a phosphate coating on the surfaces of iron, steel and zinc equipment before they were given an organic finish. These parts had to stand up under rigid salt spray, water immersion, humidity and adhesion tests before they were accepted by inspectors.

The ability to produce phosphate coatings rapidly, economically, and of consistent quality was an absolute necessity in keeping the stream of production flowing. Research chemists and engineers were constantly busy developing, improving, and maintaining this important phase of the war effort.

The quality of peace-time products will reflect the high standards and practices thus developed in war time. Manufacturers are now more conscious than ever before of the importance of getting metal surfaces in the proper condition before painting.

During World War II, our research laboratory was active in the development of new and improved chemical processes leading to increased standards of excellence for war equipment. The investigation of all phases of metal treatment in industrial production has been continued since the war ended.

As one result of this extensive research, the CrysCoat Process

(Continued on page 57)

has been developed. A feature of this method lies in its ability to combine cleaning, phosphating and rust protection prior to painting into a single operation. The phosphate layer produced by CrysCoat No. 87 is composed of very small crystals. The material is designed to yield such a type of film because laboratory and field data have shown that coatings of exceptional smoothness and more minute crystalline structure promote excellent paint adhesion properties. In addition, the deposition of the thin smooth type of coating involves negligible dimensional changes on the metal, while at the same time giving the surface the corrosion-resistant qualities necessary for extending the life of the finished product.

As with almost all present-day methods for the phosphate coating of metals, it is often recommended that the CrysCoating operation be followed by a water rinse and then by an application of hot dilute chromic acid. This procedure leaves the surface free of any excess soluble salts. In addition, chromic acid serves to give valuable increased passivity toward rusting to the surface. Under such treatment procedure, a CrysCoat No. 87 film can impart upward from 500 hours of salt spray test resistance to a painted part.

Many factors enter into research work on the production of phosphate coating materials. The search for new chemical catalysts or "accelerators" forms an intriguing problem in making the phosphate solutions work faster, with consequent increase in efficiency and reduction in cost. Some phases of research, however, are by necessity performed in industrial plants outside the laboratory.

American-Marietta Acquires Its 15th Manufacturing Unit

Another step in the expansion of the American-Marietta Co., paint manufacturing group, has been revealed by its president, Grover M. Hermann, in an announcement of the purchase of the Charles R. Long Jr. Co. of Louisville, Ky. This acquisition increases American-Marietta's nationwide chain of manufacturing plants to 15.

The Long company is currently celebrating its 50th anniversary. Its products, paints, varnishes and lacquers, are widely distributed, many of them being formulated for specialized uses. The company is a big factor in the railway paint business and a number of famous trains exhibit its finishes. In addition to Pullman and other passenger cars, paint materials are supplied for locomotives, freight cars and all right-of-way requirements.

The company has a large volume in other industrial fields, including paints for machinery and other metal products.

Mr. Hermann announced the election of Kenneth E. Clarke as president of the Long subsidiary and Walter C. Jeppson as vice president. Clarke came to American-Marietta in 1944 from the Long Company where he had been a vice president and an employe for 25 years. He is also general manager of the Ferbert-Schorndorfer division of American-Marietta at Cleveland and he will divide his time supervising the activities of both units.

Jeppson, with a ten-year association with the Long company, will manage the Louisville concern under the direction of Mr. Clarke.

Du Pont's West Coast Sales Offices

The Du Pont Co. has established two new sales offices on the West Coast to cover the Los Angeles and San Francisco areas.

The Pasadena Office (243 E. Colorado St., Pasadena) covering the Los Angeles area, will be managed by Wilbur S. Johnson, formerly Los Angeles manager for the C. L. Duncan Co. Associated with him as sales representative will be Bodine B. Barrett, formerly production supervisor at the Newark pigments plant.

George B. McCrea will be manager of the San Francisco office at 465 California St. Prior to the war Mr. McCrea was a pigment sales representative in Chicago. Early this year he returned to Du Pont after serving more than four years as an officer in the Navy.

Girls working at a double row of small spray booths in middle of room. Rod across top of each booth provides handy place to hang cup gun. Openings in expanded (mesh) metal at bottom of booth allow air suction to pull away fumes.

Special Color Effects Painted On Plastics

By WALTER RUDOLPH

AS THE COUNTRY'S oldest exclusive custom injection molders in the plastics industry, Erie Resistor Corp. of Erie, Pa., has evolved some interesting finishing procedures. The firm's production is almost solely confined to parts for automobiles, refrigerators and radios. Much of this production is of a decorative nature and highly influential in eye-appeal.

"One of the most striking types of finishing or painting we do is that which gives the 3-dimensional

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effect," stated Jerry Comstock, foreman of the plastics division's paint department. "This 'see-deep' painting, as it is sometimes called, is used almost exclusively now in the projection of lettering, designs and calibrations into the plastic pieces we turn out for many manufacturers—and we have more of the same kind of work on the drafting boards."

Smooth Molds Make Best Surfaces for Painting

The primary consideration in any painting to be done on plastic pieces, according to Mr. Comstock, is the manufacture of the die or mold inteslf which produces the piece. The cavities or depressions on these dies, which produce the parts of the plastic pieces to be painted, must be highly polished to give the final mirror-like effect which follows the application of paint.

Mirror-like surfaces in dies are important to the finishing of plastic pieces. Here is shown hand-polishing on a horn button die.

"There is no cleaning or sanding of plastic parts before they are painted," said Comstock. "This hand-polishing of the dies or molds is the integral factor in producing a fine paint-receiving surface; the best polishing jobs produce the best surfaces for painting. Another tremendous aid in the finishing of any plastic piece lies within the power of the die designer—in that parts of the piece which take painting are made more readily accessible or maskable—but more about that later."

Four Types of Plastic Used; Characteristics of Each

From the 16 injection presses at Erie Resistor come four main classifications of plastic pieces which must be sent through various stages of painting. These, along with their characteristics which have to do with painting, are as follows:

The polystyrene plastics used here are principally for radio panels or ornaments, horn buttons, or pieces which help form the selectors on juke boxes. This is the cheapest of the thermoplastic materials and it has the hardest surface. It also posed the most difficult painting problem for Erie Resistor until a special lacquer was developed in cooperation with a leading paint manufacturer.

This plastic called for a special paint that wouldn't craze the piece or distort it. Also, it was hard to get just enough "bite" into the paint so that it would adhere to the plastic. And finally, the automotive industry, which subjected finished pieces to tests of 100% relative humidity at 110° to 145° F., demanded a paint job that would stand up under these conditions in addition to producing

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the desired decorative effect. A special paint provided the answer and it is used almost exclusively in the company's polystyrene paint work now.

Secondly, in the classification of plastic materials, come the methacrylates, of which plexiglas and lucite lend themselves to beautiful ornament adaptions because of their clarity. These two plastics have been used interchangeably at Erie Resistor for automotive horn buttons, radiator and trunk ornaments, etc. Methacrylates are practically always lacquered and pose no more than the ordinary problems that arise when painting plastics.

Lacquer Type Paints Used To Assure Quick Drying

Lacquering, incidentally, is used almost exclusively in plastics finishing at Erie Resistor because of its natural aid to production problems; it dries in minutes, whereas oil-base enamels might require hours.

Butyrates are the third type of plastics which this company uses extensively for products requiring painting. Wiping excess lacquer from butyrates is ususally difficult because butyrates are soluble in organic solvents. Care must be taken that the surface lustre of the plastic is not affected.

"We've found that butyl alcohol does the best wiping job for us," pointed out Comstock. "The medium we use to carry the solvent is plain toilet tissue—the folded variety—which comes in bundles about 6-in. thick. The operator takes about a half pack, 3-in. thick, dips it into the solvent, presses out the excess liquid with her fingers, and then uses one or two folded sheets at a time for wiping excess paint off the sprayed surface. The operator is careful to avoid digging out of indentures or cavities which produce the raised letter effect beneath the surface of the finished plastic pieces."

Where some fine quality decorative color painting of plastic parts and products is performed accurately and on a safe clean production basis.

Acetates, the fourth classification of painted plastics, are similar to methacrylates, and practically the same information applies to them. The choice of these four, polystyrenes, methacrylates, butyrates and acetates, is largely dependent upon application (always the first consideration) and design problems, although at times the design is made secondary to the final decorative effect which is gained by 3-dimensional work, for instance.

"Normalizing" Plastics is Desirable Before Painting

Under serious consideration at Erie Resistor right now is the idea of "normalizing" plastics before painting operations. This has been found, during experimentation, to bring pieces to a closer uniformity in size by removing various stresses and strains throughout the entire cross section of any plastic. It is similar to the annealing of steel. Normalizing of plastic pieces would keep closer tolerances in the cavities or depressions which must be painted for decorative effects when backlighted. *(Continued on page 64)*

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"From a general classification of the types of plastics which we work with in connection with decorative painting, we might pass on to the methods employed in masking or shielding," continued Comstock. "We don't use any paper or tape in masking. We devise metal masks because they work better in the 3-dimensional type of work we do. They are easy to put in place and they enable us to speed production."

Metal Masks or "Plugs" For Accurate "Spot" Spraying

Among the merits given for these metal masks, or "plugs" as they are sometimes called, are the following: They have mechanical strength and can be handled repeatedly without impairing their usefulness. They are readily cleaned because of smooth surfaces. Their fabrication is comparatively easy. They wear a long time and do not become distorted when cleaned with solvents.

First we will consider one of the simplest masks. You have a few square inches of plastic, underneath the surface of which you want the words ON and OFF to be shown. They are to appear as if they are raised letters or words with their bases on the back side of the piece. The plastic comes from the press with cavities or depressions on the back of the piece where paint is to be applied.

However, in order for the paint which is applied to the recessed letters (or numerals or design, whichever it may be) to show up vividly and with more than one dimension when viewed from the front or top, another coat of paint must be applied. It must be of a contrasting or complimentary color, and must also be applied to the back of the plastic article. It has been found that this latter coat of paint is best applied first, but in order to keep the dark base coat from showing inside the ON and OFF letters, these depressions must be masked from the initial spray coating.

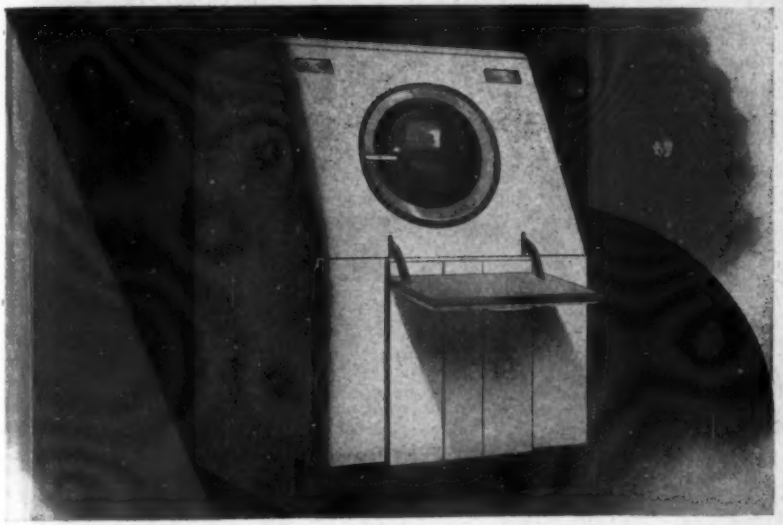
Technique of Designing and Making Spray Masks

This is done as follows: A low melting solder is poured into the depressions ON and OF, filling them flush with the base of the piece. The excess solder that runs over the edges of the depressions onto the base is ground off. While the solder, which has quickly hardened, is still in the ON and OFF cavities, bent brass pins which have been roughened and tinned are soldered to the individual letters and then to each other; this forms a makeshift handle which can be used to lift the letters from their cavities, and also serves as a brace to hold them in near-perfect alignment.

"Many times the design of a particular 3-dimensional piece of work, or a piece that will get 3-dimensional painting, is planned in such a way as to make this masking more simple," explained Comstock. "It is known as 'plug-masking,' and the cavities might be designed with sloping sides of sufficient angle so that the fine edges of the plugs spelling ON and OFF will slide more easily into their respective places."

Several Sets of Masks; Frequency of Cleaning

This manufacture of plug-masks calls for skilled work. Two sets of a dozen each are usually made for any particular production job; while a paint spray operator is using one set, another operator might be cleaning the second set



Yes indeed it will — if Stanley chemists and the research brains of the appliance industry can produce it! The problem has always been to provide an exterior finish of extreme durability and a tub lining that would withstand the chemicals contained in washing preparations. We're still seeking to improve finishes which seem to be perfect . . . and the search will never cease! Perhaps you have a finishing problem more or less complex. Asking our advice incurrs no obligation. Write to the Stanley Chemical Company, East Berlin, Connecticut, manufacturers of Stanley Enamels, Lacquers, Synthetics and Japans.

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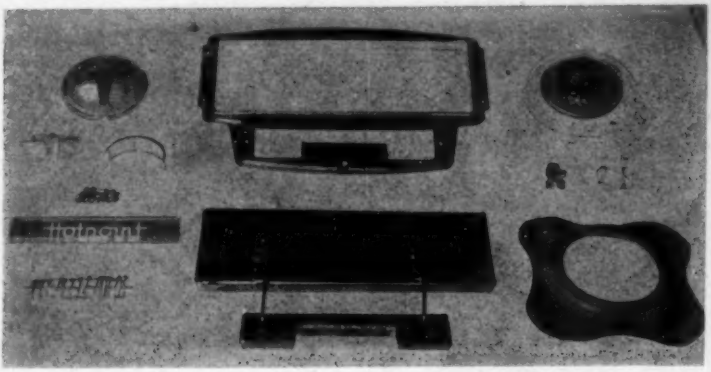

Here are shown plastic automobile horn buttons, refrigerator name plates, radio fittings, etc., and the masking shields used in connection with painting them.

in thinner. A clean dry set can be used three or four times before re-cleaning is required. Frequent cleaning prevents paint from building up on the fine edges of the plug and thereby causing raggedness in the finished letters.

The type of plug just described is made for many kinds of lettering and designs, as well as calibrations. After the plug is inserted in the plastic piece and the back of the piece is given the base coat which is intended to compliment the letters or numbers, etc., the plug is removed and the cavities which spell "on" and "off," for example, are sprayed with the desired color for the job. Metalescent and pearlescent paints are usually preferred for the fine quality and stand-out appearance which they give to any such application. Bronze, gold, silver and related tints are used in the color range.

Copper Plated Shields With Cut-Out Openings for Spray

Another type of mask employed successfully at Erie Resistor is the copper plated shield. The side of the plastic piece to be plated is sprayed with a good electrical conductor, such as silver, and then the whole article is immersed into a copper plating bath where layers of copper are built upon the silver to the desired thickness. Sections of this copper shield or mask are then cut out with jewelers' tools to the specifications of the design to be painted. When the paint is sprayed, only the cut-out openings allow paint to touch the plastic.

Let us assume that one of these copper plated masks is used on the horn button beneath the surface of which is spelled "Ford" in flourishing, blue letters. In this case you have an "o" which becomes detached from the long-hand style of lettering that spells "Ford." To preserve the "o" in the mask, it is delicately retained in its proper place after cutting out by soldering it into position on piano wire which is soldered to the rest of the mask.

Still another type of masking is used for large window openings (as they might be termed) in radio ornaments. These ornaments are

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THE CASE OF...

The Faulty Technique

How a Du Pont Finishes Engineer Eased a Production Headache

REJECTS were mounting in a finishing plant for washing machines. This meant re-finishing of many pieces, excessive consumption of materials, and rising costs. The plant manager knew that lack of experienced help underlay his trouble. Though the problem was organizational rather than technical, he decided to consult his Du Pont Finishes Engineer anyway. Surely the latter's wide range of experience in straightening out production problems would be useful.

The Du Pont man, trained in systematic methods, made an hour-by-hour tabulation of reject causes—found three. Defective metal panels weren't being properly culled; spraying technique was frequently faulty; and the stenciling applied by manufacturers to the sheet metal was "bleeding" through the finishes. Accordingly, the Du Pont man made certain recommendations—and soon the reject rate dropped to a remarkable low.

What remedies had the Du Pont man suggested? First, a metal inspection system was set up to catch defective panels before painting. Second, an experienced sprayman was stationed where he could correct sprayers who fell into bad habits *before* they filled the baking oven with potential rejects; and third, steel companies were persuaded to use a different type of stencil ink.

Have *you* a production problem? If so, don't forget your Du Pont service man. Chances are he's licked a similar prob-

hique

lem before. Let him solve yours —with a minimum of delay and lost motion.

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INDUSTRIAL FINISHING Magazine

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designed to be opaqued on the side that goes next to the radio, but if they were spray-painted indescriminately, much of the spray would go through the large openings in the pieces and smear the face side, as well as covering the fine edges.

This overspray is prevented by large plugs constructed of thin gauge steel or brass. In individual cases, each of these large plugs might be attached, by soldered arms, to a smaller plug for a small window opening on the bottom side of the radio ornament. You might visualize, for instance, the opening through which the radio listener watches the dial needle on the numbers, and the smaller oblong opening beneath the dial opening from which might protrude push-button controls.

These large masks are not just thin pieces of metal. They are expertly constructed by metalworkers in such a way as to fit into the window openings on a taper or angle to prevent the possibility of sprayed paint going through to the other side of the ornament. With the use of these tapered plugs, the opaquing paint covers the back of the plastic pieces to the extreme edges of the opening without spilling over and calling for a clean-up job or necessitating a more complicated mask.

Ten Facing Spray Booths Are Handy for Workers

All of the decorative painting described in this article is done in a paint room measuring about 25x50-ft. Custom-built spray booths extend through the central

Cleaning and polishing plastic products at the soft linen buffing wheels.

Stamping presses and pigmented tape are used at Erie Resistor in hot-foiling small plastic pieces which otherwise would present a difficult finishing problem—if regular painting procedure were followed.

portion of the room. Operators have work tables at their elbows. The lacquer overspray and fumes are pulled down through a large-mesh floor in each booth.

The finishing room is well-lighted for ordinary work, but inside each booth, just in front of the operator, there is a 60-watt bulb which is useful in opaquing operations; the work is held so that the back-lighting of the bulb shows just how much of the plastic piece is already opaqued.

"These spray booths are constructed of steel paneling in such a way as to permit easy cleaning, and additions to either end, or the cutting out of any idle section to increase air suction in another section," said Comstock. "The large mesh flooring of each booth can be lifted and replaced with solid panels to shut off the air suction when desired. The suction draft is provided by an airplane propeller type of fan mounted in a large tubular construction at one end of the spray booths.

Hot Foiling Perfomed at Small Stamping Presses

Two other types of painting, or rather finishing, remain to make coverage of Erie Resistor plastics complete. They serve peculiar purposes. First, in some plastic pieces there are areas of depression to be painted which would give a difficult wiping problem; the alcohol would work into the cavities holding paint and distort the quality of the finished work; or the contours and irregularities of a certain piece might make painting from the rear very difficult. Hot-foiling serves in these cases.

Hot-foiling is done on a series of small stamping presses located in another room. One of these machines can stamp a plastic piece about 12-in. square; others handle various sizes. Depending upon the shape of the plastic piece, the pigment in tapes which are used in these machines, and the type of plastic being stamped, the temperatures and pressures are varied on these presses.

Temperatures vary from 350° to 500° F., and are automatically regulated. Pressure is entrusted to experienced operators, who must gauge it to prevent breakage while still doing an imprinting job. On a very brittle piece, for instance, a high heat is used with very little pressure by the stamping press. Experienced operators move swiftly and can run from 4000 to 5000 pieces of stamped material through per shift, depending upon the specifications of the particular jobs.

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Hand Painting; Wiping; Inspection; Buffing; Packing

Hand-painting at Erie Resistor involves the squeezing of paint from a rubber bulb through a hypodermic needle into small calibrations or minute lettering. The shape or size of the plastic piece might be too difficult to handle in a spray booth. Hand painted pieces are put in a slow-moving conveyor belt which carries them along to a worker for wiping, another worker for inspection, and on to packaging.

Some of the hand painting and wiping operations leave a slight film on the plastic surface, or perhaps occasional specks of paint on either side of the finished plastic piece. These paint specks and smears are removed in the buffing department where a battery of 18 machines with soft linen wheels give all finished pieces a uniform high quality gloss. Most of the packaging consists of wrapping the pieces in individual soft tissues to prevent any nicking or scratching that might result from the pieces jostling about in roughly handled boxes or cartons.

Monsanto Chemical Co. of St. Louis, Mo., predicts that plastic-coated fabrics will be used in many of the 200 million pairs of work gloves which people will buy in '47.

Dolan Adds Equipment

V. J. Dolan & Co., manufacturer of finishing materials, Chicago, Ill., has installed a new 2000-gallon cotton cutter which provides additional lacquer production capacity of about 4000-gallons per 12-hour period—almost a carload a day.

The company has on order a new high-speed ball mill of 500 gallons capacity and a new high-speed J. H. Day roller mill.

This added production equipment will enable the company to take care of an increased volume of business.

Random Comment on the Industrial Scene

(Continued from page 11)

available. Made in rich colors, it will not chip or crack, is impervious to grease, oil, alcohol, and mild acids. It is suitable for use in the florists trade, millinery, artificial jewelry, display fixtures and novelties. Other uses for this colorful plastic-coated wire will be found.

* * *

Automobile Washer — A new, revolutionary mechanical automobile washer that can wash, polish and dry a car a minute, and which requires only three attendants for its operation, is now being manufactured by the Minit-Man Car Washer Div., 7450 Melville at Green, Detroit, Mich. The new machine, known as the "Minit-Man Automatic Car Washer," washes not only automobiles and taxicabs, but panel delivery trucks and similar vehicles. The machine consists essentially of two units—a washer and drier. The washer employs a series of brushes (on which water is sprayed) that revolve continuously and are brought to bear against the front, top, sides and rear of the car to completely remove all of the dust and dirt from the exterior of the car. The drier directs a series of air currents at the car which remove all of the water in such a way that there are no streaks or spots left and the appearance of the finished surface is said to be that of a car that has been completely and carefully hand wiped.

* * *

Carbon Monoxide Detector—The National Bureau of Standards has developed a simple and inexpen-

for faster selling phenolic plastic moldings use a Monsanto specialty finish

Wide experience in both the plastics and finishing fields has enabled Monsanto to formulate a series of specialty finishes for plain-color phenolic moldings. Molders find that with lower price molding materials, a Monsanto specialty finish assures top eye appeal and durability.

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sive yellow gel for use in a 5-in. glass tube about the size of a pencil. When subjected to air contaminated with carbon monoxide, the gel turns green. The degree of color change indicates the amount of poison gas in the air. This gas is generally the result of incomplete combustion in engines and stoves. Such an indicator should prove valuable in garages, hangars, furnace rooms, airplanes, busses, etc. The detector is not an experiment; it is a completed reliable product.

* * *

Prefabricated Houses—The National Association of Real Estate Boards predicts increasing acceptance for ready-made houses in the next five years. At present, factory made houses cost practically the same as carpenter-built construction. However, mass production should produce savings and reduce cost to the prospective owner. Who knows, perhaps hidden somewhere in the vast list of prefabricators, there may be a Henry Ford. For a great many years, the "ready-cut" house has struggled on and off the market. Perhaps with a new name, improved design and low cost, these houses will become as popular as cars in the low-priced field used to be before the war.

* * *

Plastic Shoes—Plastic footwear will be the answer "when the time comes for us to get after the export market and provide shoes for millions of people throughout the world who have very little money," was Mark Bortman's recent prediction for retailers in the retailing plastics course sponsored by The Society of the Plastics Industry and New York University.

Mr. Bortman, an authority on plastics in apparel and accessories, outlined the rapid technical advances in the use of plastic sheet and finishes in shoes, handbags, rainwear and housewear—most of which today is fastened by electronic welding. Mr. Bortman declares that, "The potential of plastic products is limitless because they are man-made and not subject to nature shortages, and can be made in limitless forms, styles and colors."

* * *

Refrigerated Food Shipments—Improved refrigerator cars and trucks may be expected soon. A recent test was conducted in shipping bananas in four new type refrigerator box cars from New Orleans to New York. Improved design in cars has been made and the changes have been accepted by the railroads. These improvements represent a step forward in transporting perishable foods.

Keystone Varnish Co. Holds 1947 Sales Convention

What the enlarged postwar paint market means to the paint industry was the main topic discussed at the Keystone Varnish Co.'s 1947 sales convention, at the St. George Hotel, Brooklyn, N. Y., January 7 and 8.

D. C. Arnold, president of Keystone, told the members of his organization that the huge national building program would probably keep the paint industry's production at peak levels for the next four years, if not longer. However, he pointed out that shortages of paint materials and containers would be a serious problem and challenge for a while.

During the 2-day convention, which was directed by A. K. Coffin, the firm's secretary, and director of sales, the current over-all paint situation was discussed, and the production and sales policies of the company were presented in detail. Other Keystone officials who addressed the convention were H. F. Foster, treasurer; C. G. Oswald, research and production director, and F. N. Stearns, purchasing agent.

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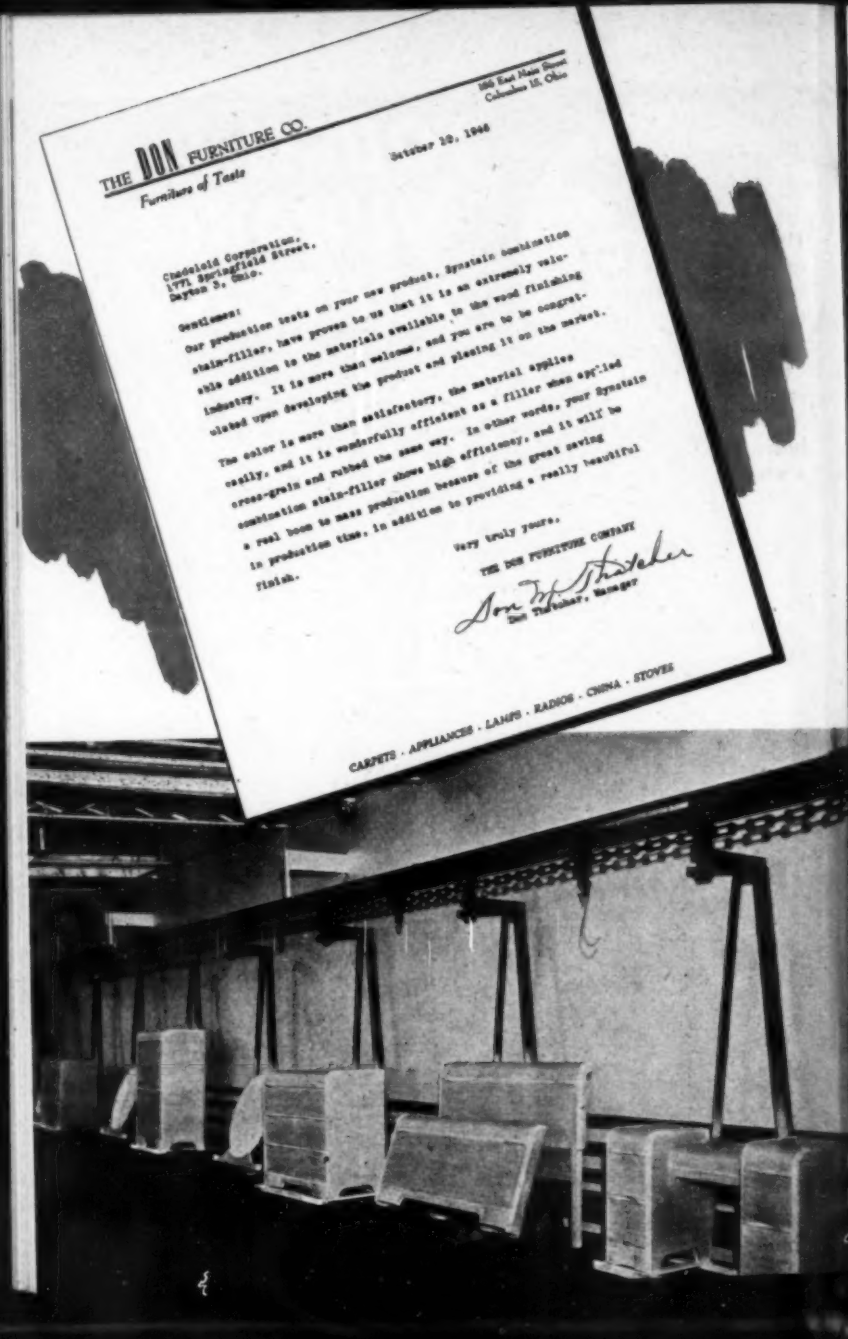
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At left, conveyor line at Johnson-Carper Furniture Co., Roanoke, Va. Furniture pictured is stained with Southern Varnish Company's Redwood stain, manufactured under Chadeloid license.

The three pieces, above left, on which Synstain combination stain-fillers were used, are products of The Dan Furniture Company, Columbus, O.

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By J. Donald Bostrom
President Screenprinting & Flocking Industries

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rials are used; these include water-soluble, oil-base, synthetic-base and lacquer-base materials.

Work begins with the cutting of a stencil. Different methods of cutting the stencils are used. We get ready for the cutting of a stencil by first lightly coating both the stencil paper and the master drawing with rubber cement. As you know, rubber cement will only stick to itself. A very light coat on both drawing and stencil gives enough adhesion to hold the two firmly together while the stencil is being cut. Also, if the stencil cutter wishes to do so he can raise the stencil enough to look at the drawing. This is necessary at times to see an intricate design or some very fine lines. A rigid back knife is used for cutting the design.

Adhering the Stencil to Silk Screen

The kind of adhering medium to use for making the cut stencil stick to the silk screen—this depends upon the type of process paint or adhesive to be used in the stencil printing job. If water-soluble material is to be used, any stencil except a carbon tissue film may be put on the screen. If the printing material is oil-base, then any type of stencil may be used. For synthetic-base material we have found it safer to use a lacquer proof film, as some synthetic materials will affect certain types of lacquer stencils.

Also, the use of strong solvents for removing synthetic paint from a used screen at the end of the day, or at the end of a run (if the screen is to be kept) will sometimes break down a lacquer stencil. If lacquer is to be used in printing, a photographic stencil or a lacquer proof film is used. For cleaning either of these stencils lacquer thinner is employed.

Lacquer thinner contains a certain amount of moisture which sometimes affects the stencil, causing it to become brittle—and the edges of the design curl away from the silk. This is especially true in the case of screens used for long or repeat runs, necessitating frequent washing. Also if the photographic stencil is used, moisture in the thinner will affect the carbon tissues which is water soluble. We use a special cleaning thinner which contains a minimum of moisture to eliminate these difficulties.

Of course the obvious rule is to wash the screen with a material that will not dissolve or damage the stencil. To remove the stencil from the screen, use a solvent of the adhering material.

There is no need here to go into detail on the thickness and width of the wood frame, both of which are dependent upon size of frame and its rigidity requirements; nor the methods used to stretch and hold the silk over the wood frame to produce a tight smooth screen. One edge of the frame that holds a completed silk screen, with stencil adhered, is attached to a flat top table by means of loose-pin butts (like house door hinges). Guides on the table must be adjusted to hold the work properly to produce correct register of colors, etc., in the printing. Then the printing material (process paint or adhesive) is forced through the stencil openings by pressure of a rubber squeegee which is drawn across the screen by hand.

Instead of using a hinged prop on the side of the screen frame to hold it up while work to be printed is being put in or removed, we

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have found it much more desirable to use a long flexible coil spring. One end of the spring is attached to a vertical support, while the other end is fastened to the center of the frame opposite the operator. The length and tension of this "screen door" spring is sufficient to pull the frame up after pressure on the squeegee is released, and to hold the frame up clear of the work. The coil spring is arranged to permit easy access to the printed work, yet at the same time it does not raise the frame high enough to allow the process paint to spill over the back edge and onto the table.

For some of the long production runs, screen stencil frames are hinged to raised blocks on the table; this makes it possible to stack 35 to 50 sheets, depending upon weight of paper, under the screen. By this method, the operator merely removes one printed sheet on each cycle. The cutting out of a single sheet insertion per cycle increases production as much as 300%.

Contact and Off-Contact Printing in Production

There are two general methods of silk screen printing—contact and off-contact. The difference between the two is just what the name implies. In contact printing, the stencil screen rests in contact with the work to be printed. In off-contact printing, the screen is at rest about $\frac{1}{8}$-in. above the work. Contact printing is used only where an entire solid area is to be printed, or any extremely large area printing where the work would stick to the bottom of the screen in any event.

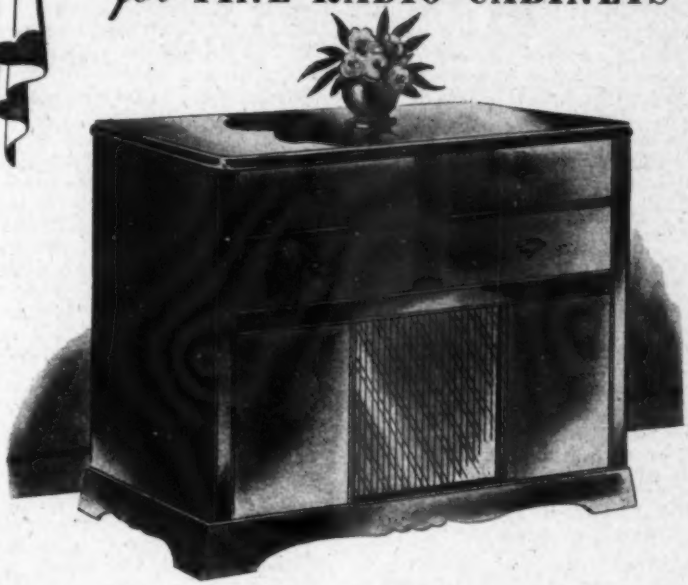
In off-contact printing, the pressure of the squeegee, as it moves along, forces the screen down into "line" contact with the work, but the screen quickly snaps back away from the work as soon as the squeegee passes. Off-contact printing makes for clean cut lines and sharp detail; it allows the paint to flow out so as not to pinhole. Also, this method prevents blurring and distortion, especially on fairly large printed areas.

Squeegee Blades for Different Types of Work

The squeege is of utmost importance in silk screen processing. For fairly large areas to be processed, a reasonably rigid squeegee blade, with a bearing edge $\frac{1}{4}$-in. to $\frac{3}{8}$-in. thick is satisfactory. For extremely small screens, or where the surface to be printed is not perfectly flat and smooth, a squeegee blade with a beveled edge will give better results. The reason for this is that it is more flexible and the rounded point of the bearing edge allows it to ride

Screen processing small work. Notice the upright nailed to back of work bench. A coil spring, extending from near the top of this upright to frame of screen stencil, pulls the screen up off the work when it is not being pressed in position by the squeegee.

A-M *Fine Finishes for* FINE RADIO CABINETS



The best efforts of the skilled cabinet maker deserves the perfection of finish found in A-M Fine Finishes.
Rich textures and natures artistic graining are subtly enchanced by these special wood finishes.

A-M Laboratories are happy to help you with your finishing problem.

A-M FINE FINISHES

AMERICAN-MARIETTA COMPANY
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over slightly raised sections of the surface and still print the design. An example of this occurs in coating copper screen wire with an adhesive; or a plastic ash tray about 3-in. in diameter with a series of target rings in the bottom, raised about 1/32-in., with a trade mark design in the bulls eye. On difficult screen printing jobs it may be necessary to do some thoughtful experimenting to find which type of squeegee gives the most suitable flexibility; and what kind of working edge will result in an improvement in the quality of the work.

The number of different items adapted to silk screen processing is almost without limit. To mention a few, there are signs of all kinds, name plates, decorative features, buckram school book covers; red, white and blue barber poles, specially processed to show a spiral of light as they revolve, and countless others. The process is used extensively in applying adhesives for flocking which I shall discuss in a future article.

The Effect of Framed Pictures on Glass

Space does not permit going into great detail on methods and procedures on the many items processed in a custom shop. However, processing the glass picture shown in the photograph at the start of this article will serve as one example. These pictures are self contained; the frame and mat decoration are screen processed on the back of the glass. A full color picture, on very thin paper, is also attached to the back of the glass.

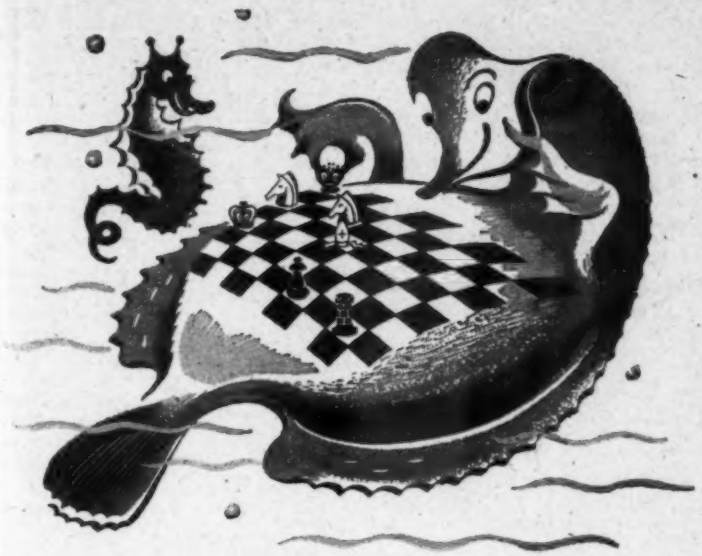
Over the entire back, a coated, heavy weight, backing paper and hanging ribbon are applied. Originally the idea was to eliminate the wood moulding frame. This was solved by screen printing the frame in reverse on the back of a piece of double strength glass with ground edges. A special oil-base paint is used.

The next problem was to find a suitable adhesive to securely hold the backing over the painted area. A water-soluble glue, intended for this purpose, was used principally because it was transparent and because of it's great holding power. The claims made for it's tenacity in holding the backing in place were not exaggerated. The backing paper could not be torn off with a pair of pliers. However, this adhesive did not have sufficient elasticity. Upon drying it became hard and brittle, and it had such pulling power that it caused the paint on the glass to alligator after about 60 days.

Adhesive Coating and Sealer For Use on Glass

The problem was solved by changing to a synthetic alkyd-resin adhesive which has excellent adhesion, crystal clear transparency, and retains sufficient elasticity to prevent all crazing or alligatoring of the paint. The backing paper is given a double coat of this adhesive on both sides, prior to adhering it to the glass. This adhesive coating seals the paper against moisture and atmospheric changes which otherwise would cause some slight expansion or contraction.

Immediately following application of the backing paper, the hanging ribbon is placed in position under a smaller piece of backing paper. The entire operation is continuous. Paints and adhesive are both applied by silk-screen process. The double coat of ad-



Checkerboard Champ . . .

The Mediterranean flat-fish is the chameleon of the sea, changing color to match its background. One experimenter even got the flat-fish to imitate a checkerboard, by placing it on black and white squares! The versatile flat-fish works this trick by shifting loose grains of pigment around under his skin.

For a versatile answer to industrial surface coating problems, think of lacquer. Lacquer is the finish that's easy to apply, durable, attractive, fast drying. Your supplier would like to tell you about lacquer in more detail.

COMMERCIAL SOLVENTS
Corporation

CSC makes solvents and plasticizers, but is not a lacquer manufacturer.

hesive is previously applied to the backing paper in large sheets, on a roller coating machine.

Editor's Note: This is the first of two articles by Mr. Bostrom. In the second, which will appear in a future issue, he describes flock adhesives and their use, types of flock, and how applied.

Pierce & Stevens, Inc. Adds Two Men to its Staff

R. D. Stevens, president of Pierce & Stevens, Inc., Buffalo 3, N. Y., recently announced the appointment of two additions to the Buffalo Staff. They are William G. Cook, who joins the Sales Department, and Thomas P. Barron, Advertising Manager.

Mr. Cook was recently honorably discharged from the U. S. Marine Corps.

Mr. Barron was assistant advertising manager for a company in Bradford, Pa., following his separation as a First Lieutenant in the Army Air Forces.

"The Battle Against Rust" by Rust-Oleum

Rust-Oleum Corp., 2425 Oakton St., Evanston, Ill., manuacturer of rust preventive products including R-9, the new liquid rust preventive, has recently issued a new sound film on "The Battle Against Rust." The motion picture, according to Robert A. Fergusson, president, is intended for use at sales meetings with distributor organizations, conventions and open-house gatherings for customers.

The film's 12-minute running time opens with statements and illustrations on cost and damage caused by rust. This leads into an animated explanation on reasons why Rust-Oleum differs from regular paint. The following section of the picture deals with demonstrations on speed of application and ease of coverage when Rust-Oleum is used. The fourth section of the film takes the audience on a tour through the Rust-Oleum plant, showing the various steps in manufacture of the company's rust preventive products.

The concluding section of the picture includes cinematic suggestions on the various uses of Rust-Oleum. Among these are the protection of fire-plugs, fences, trucks and trailers, large bridges and railroad equipment.

Fuller & Co. and Nason & Co. Combine on Pacific Coast

Western users of industrial finishes were notified recently of formation of the new Fuller-Nason Industrial Division of W. P. Fuller & Co., combining the specialized industrial finishes departments of two pioneer paint companies in a single establishment, by far the largest of its kind on the Pacific Coast.

Effective February 1, the new division brings together the industrial finishes sections of W. P. Fuller & Co., oldest and largest Western paint firm, and R. N. Nason & Co., also a pioneer company and a leader in the development of many modern industrial and automotive finishing products and techniques.

Outside the field of industrial finishes, the two companies will continue their independent operations.

Construction of a $1,000,000 plant specially designed to provide the most modern production, control and research facilities for all of the many types of specialized industrial finishes has been started at Fuller's South San Francisco factory.

Until this new plant is completed, present Fuller and Nason facilities at San Francisco, South San Francisco, Los Angeles and Portland will be utilized.

D. J. Tight, president of R. N. Nason & Co. for many years, enters the Fuller organization as Industrial Advisor. Succeeding him as R. N. Nason & Co. president is W. W. Holt, long a co-worker with Mr. Tight in direction of that firm's affairs.

In charge of the production end of the new Fuller-Nason Industrial Division will be W. P. F. Brawner, Director of Production for W. P. Fuller & Co.

General Sales Manager H. S. Margetts will direct the industrial sales staff, which will operate as a part of the W. P. Fuller & Co. General Sales Department. C. E. Ide will be in charge of Fuller accounts and Gloyd Stankard will direct the handling of Nason accounts.

Establishment of the new Fuller-Nason Industrial Division is a result of the great expansion on the Pacific Coast of production-line manufacturing, according to President A. H. Brawner of W. P. Fuller & Co.

By pooling resources of the two departments, the merger provides a larger staff for on-the-job consultation and gives each of the research men the opportunity for further specialization, in addition to the obvious advantages which the new plant will offer in the way of ultra-modern equipment and production methods.

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NOVELTY FINISHES

IN STEP WITH THE TIMES

Industrial Finishes

that make the most of available raw materials to give you greatest durability, together with attractive appearance and economy.

• FOR APPLICATION BY ALL METHODS

JAMES B. DAY & CO., CHICAGO

Letters from Readers

Luminous Paints

Would you please send me the names and addresses of manufacturers who sell different kinds of luminous or luminescent and flourescent paints, as described in September issue of INDUSTRIAL FINISHING, by J. P. Callahan?—G. M.

Our reference card shows that several concerns can supply luminous paints. We are sending you the names and addresses of a few by letter.—Ed.

Flock Adhesives

We are interested in obtaining information pertaining to manufacturers who carry flock adhesives—for use by spray, brush and silk screen application. Application to be made on such materials as wood, cloth, rubber, metal, etc. Any information you can forward to us will be greatly appreciated. — National Flocking Co.

Try Industrial Tape Corp., New Brunswick, N. J.—Ed.

Polishing Metal

We are engaged in the production of a complete line of fishing reels, as well as several other items requiring the finishing of a variety of small parts in stainless steel, aluminum and brass. We would appreciate receiving any literature or advice as to where information may be obtained regarding the production polishing of these parts. Any assistance which you may offer in this regard will be greatly appreciated.—L. Corp.

Try Lea Mfg. Co., Waterbury, Conn., and James H. Rhodes & Co., 157 W. Hubbard Ave., Chicago 10, Ill.—Ed.

Tack Rags Wanted

We are interested in obtaining a material known by parts of the trade as "tack rags"—a non-marking cloth for wiping finished products.—J. & J.

Look at the advertisements in January issue, pages 8, 117 and 130. —Ed.

Silk Screen Painting

We are enclosing a clipping from the "Letters from Readers" column of your magazine for April 1946. The question—Silk Screen Painting—is one which we face at this time. Would you please send us information concerning same?—G. Co.

In a letter we are sending you tear sheets of some articles published on the silk process in previous issues of this magazine. Other articles have been printed, but our supply of tear sheets is exhausted. For further information on the silk screen process, we suggest that you communicate with one or more of the following concerns:

The Sherwin-Williams Co., Graphic Arts Dept., 101 Prospect Ave., N. W., Cleveland 1, Ohio.

Nas-Dar Co., 469 Milwaukee Ave., Chicago 10, Ill.

Colonial Process Co., 140 W. 23rd St., New York, N. Y.—Ed.

Electrostatic Detearing

Some time ago there was an article in your magazine about the electrostatic detearing of dip-painted pieces. Which issue of the magazine carried this article—and what firm supplies the equipment?—U. E. & P. Co.

An article on this subject appeared in June 1946 issue, beginning on page 31. The equipment is advertised on page 32 of January 1947 issue of INDUSTRIAL FINISHING.—Ed.

Can Supply Plastic Sheets for Coating Walls

In regard to the Canadian inquiry entitled, "Sheets of Plastic Coatings for Walls," as published on page 92 of December issue of this magazine, we will be able to take care of the inquiry referred to, as we are offering for sale a plastic material in rolls that is suitable for hanging by decorators and paper hangers.

If you could send us the name of the person or company we would be glad to send them complete information or, if you prefer, have them get in touch with us in connection with

FURNITURE MANUFACTURERS! GET THIS NEW FREE BOOKLET ON FINISHING

New twelve page booklet covering 4 basic steps in wood finishing. Contains factual information and illustrations. Write for your copy today. Ask for bulletin No. I. F. 2.

SUNDSTRAND MACHINE TOOL CO.
PNEUMATIC MACHINE DIVISION
2562D ELEVENTH STREET ROCKFORD, ILLINOIS, U. S. A.

the subject.—Scott Paint & Wallpaper Co., Inc., 68 King St., East, Hamilton, Ont., Canada.

In the December issue of this publication we notice, on page 92, your request for information regarding manufacturers of sheets of plastic coatings for walls. We suggest your enquirer get in touch with Mr. Maurice Bloomfield, at Bloomfield & Sons, Alexandra St., Montreal, P. Q., Canada.—A. R. C. Corp.

Non-Toxic Colors Wanted

Would you please send me the address of Bauman & Peiffer Mfg. Co. (Attention Robert H. Peiffer), as mentioned in the article, "Design and Decoration of Toys" in the December 1946 INDUSTRIAL FINISHING? What I am interested in is the name of the paint company that supplies them with the sealer and non-toxic colors referred to in the article.—F. F. F.

The company's address is 44 Allen St., Rochester 4, N. Y.—Ed.

Gold Leaf Wanted

Could you supply us with the address of any manufacturers or exporters of gold leaf? We use a considerable amount of this material in connection with our work and are having difficulty in securing supplies. Any information you can give us will be greatly appreciated. — O. G. M. (Signs) Dunedin, N. Z.

Solid Film Coating for Screen Wire

We are interested in procuring a wire coating material that will compare favorably with the coating on the wire-coated sample we are sending you. We are also interested in learning about the process of applying the material to the galvanized screen wire.

For your information, please be advised that we have started to manufacture this material, but are troubled with air bubbles. We want greater toughness and durability and a cheaper material than we are now using. At this date, we use 25 to 50 drums of wire coating material and thinner per month.

Can you advise what concerns are now supplying this material to other manufacturers? We want to contact them to learn more about the process and to obtain a cheaper and better material than we now use. This material is used as substitute glass in chicken and brooder houses and for all farm buildings.—S. Mfg. Co.

We are not sure which concerns can supply the kind of durable clear coating that will cover and bridge over the openings in screen wire, as your samples show. In a letter we are naming a few firms that may be in position to supply what you want. Perhaps some who read your published letter will advise us more specifically on this. Our suggestion is that the material be applied by roller coater.—Ed.

Bowling Pin Coating

We notice an inquiry for a "Protective Coating for Bowling Pins," on page 96 of the January issue of this magazine. We believe we have a finish that might be satisfactory for this purpose and would appreciate your putting us in touch with the concern who is interested in this finish.—Egyptian Lacquer Mfg. Co.

Coatings for Awnings

Being near the ocean, the salt air quickly destroys our canvas, which we use as an awning and roof. We do not roll this canvas and would like to learn of a coating, plastic or other, which we could apply as a preservative.—W. J.

Can Furnish "Dipoline"

On page 86 of December issue, one of the readers requested information for "Dipoline." We manufacture this and similar types of coatings for finishing dolls, and would be pleased to receive the name of the writer from Sao Paulo, Brazil.—J. Landau Co., 221 Wooster St., New York 12.

Information supplied.—Ed.

Can Supply Flock Coated Paper in Rolls

On page 94 of January issue of this magazine, your reply to the P. S. W. Co. states that you do not know who manufactures flocked paper in rolls. Please be advised that we have perfected the process of flocking paper in rolls in various finishes and in all colors. If you will refer this information to the P. S. W. Co. and to any other inquiries in the future, we will greatly appreciate it.—Coast Industries (Mfrs. of Synthetic Plushes, Suedes, Velvet and Velours), 1500 W. Manchester Ave., Los Angeles, Calif.

Remember Pearl Essence for

A Decorative Finish

MEARLMAID Pearl Essence is being used on hundreds of different products to produce a decorative and attractive effect.

Investigate the numerous advantages of a Mearlmaid Finish before you select the final coating. Its sales appeal and merchandising value are important.

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Has High Reflective Light Value

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WORLD'S LARGEST PRODUCERS OF PEARL ESSENCE

Questions and Answers

Finish on Bleached Mahogany Blisters

Can you tell me what to do to stop blistering of mahogany after I have bleached it with B..... (a commercial wood bleaching material advertised occasionally in this magazine)?

After I bleach it I use lacquer sanding sealer and lacquer. They both blister badly and as I have a lot of this work coming up, I thought that you might help me to overcome this trouble.—A.M.H.

The cause of blistering in bleached mahogany or other bleached wood is that the chemical action of the bleaching solution has not been completed. It is still "working." When a coat of lacquer sealer is applied, small blisters form in the lacquer film because there seems to be a gas of some sort forming during the bleaching cycle. This gas exerts a pressure on the soft lacquer film and forms a tiny bubble that may not be visible to the naked eye. Where the blisters do not show up greatly in the sealer coat, sometimes they will show more prominently in succeeding coats.

There are two solutions to the problem. One: Let the bleach dry a full 72 hours before beginning any finishing operations on the bleached surface—and be sure to sand the surfaces smooth and blow off all of the resulting dust before finishing.

Two: (And perhaps the safest). Neutralize the action of the bleach. The piece to be finished is bleached in the regular manner and left to dry for at least eight hours, or better 12 hours. The bleached surface is sanded smooth and then sponged off with a solution of warm water (½-gallon) to which has been added one cup of white vinegar. Some finishers recommend more vinegar but I believe this is sufficient and it doesn't leave the wood in an acid condition, which would be another problem. The wood is allowed to dry eight hours or more and then is sanded lightly and finished in the regular manner.

To help speed up the drying so that finishing can be started in about four hours, swab the neutralized wood surface with ordinary alcohol. The alcohol tends to absorb quite a bit of the moisture in the wood and speeds up the drying.

To further the drying still more, so that finishing can take place in half an hour or more, would be to have some means of force drying in a warm room.

You may be applying your bleaching solution too wet. Apply only enough to wet the surface evenly.—ED. HOGSTROM.

This blistering trouble on bleached mahogany is not uncommon. The usual practice is to air-dry the bleach overnight, sand the surface, and then proceed with the finishing. Lacquer coats applied 24 hours after bleaching do

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An *Outstanding* Line
of Wood and Metal Finishes

OF PROVEN worth in product finishing, any material in the New Period line of production finishes will satisfy the most exacting needs. For example, attention is directed to the following items:

No. 282 LACQUER SEALER—A modern formulation, high solids Lacquer Sealer that sands in one hour. Economical to use; geared for fast production schedules. Order a five-gallon test sample at drum price to actually see for yourself that here is a sealer that you can use to excellent advantage.

NEW PERIOD LACQUERS—Here is a complete line of superior gloss, semi-gloss, clear and pigmented lacquers. The stamp of approval has been put on these NEW PERIOD Lacquers by many satisfied users. A production sample will convince you.

Other items in the New Period line — baking enamels; primers; synthetics; stains; fillers; shellac; varnishes and supplies are quality materials of proven worth.

OUR COMPLETE LINE OF NEW PERIOD FINISHES AND OUR LABORATORY FACILITIES ARE AT YOUR SERVICE. WRITE US!

NEW YORK WOODFINISHERS' Supply Co.

108 IMLAY STREET BROOKLYN 31, N. Y.

not usually show blistering unless the finish is force-dried.

If a very thorough job of bleaching has been done, enough free oxygen may remain in the wood to cause blistering the next day, even if the lacquers are not force-dried. Several methods of overcoming the difficulty have been used. One is to *allow the bleach to dry 48 hours before finishing.* That usually suffices, even if the final coats are to be thoroughly force-dried at, say, 150° F.

Another method that has been used successfully is to allow the bleach to air-dry five or six hours, sponge off with clear water, and follow with a wash of a 10% solution of sodium bisulfite (not bisulfate) in water, or a 5% solution of oxalic acid. Then wash off again, dry overnight, and proceed with the finishing. With any bleach, it is highly advisable to wash the bleached surface with clear water and dry it thoroughly before finishing. This removes chemicals that might otherwise damage the finish.

Still another method that has been used successfully is to bleach, wash, and then force-dry 8 to 15 hours before finishing. This permits bleaching one day and finishing the next, with no danger of blistering, even if the lacquer coats are force-dried.

Do not try to speed up drying of the bleach by putting the furniture in a hot room immediately. Let it stand at least one hour. Then you can force-dry it at 110° to 150° F. without in any way interfering with the bleaching action. If you have force-drying facilities available, you can soon work out a satisfactory schedule that will fit your particular conditions and your particular merchandise. As a start, try the following: Bleach, air dry one hour. Force-dry two hours. Wash bleached surface with clear water and force-dry six or eight hours. That may do the trick. If it doesn't, increase the drying time after washing off.

If you must depend upon air-drying, start by allowing the bleach to dry five hours. Wash off and air-dry overnight. If that doesn't do it, then air-dry an additional 24 hours. This is almost certain to be successful.—RICHARD BLACKWELL.

Graying and Bleeding of Wood Filler

We wonder if you can be of some help to us in solving one of our major problems? Although we use a quick-drying filler, it turns gray in the pores and sometimes bleeds. Our problem is how to remedy this situation. If you can see your way clear to forward us an answer to this problem, we shall be grateful.—M.A.

Anyone who has used wood filler in quantity knows what is meant by "gray filler." It is an annoying condition where the filler, instead of holding its true color in the wood pores, takes on an unsightly milky grayish cast. In bad cases whole areas may show a spotted, variegated color, especially when viewed from an angle. In extreme cases the lacquer sealer over each pore may turn dead white. Many things can cause gray filler, and tracking down the trouble in any particular case may not be an easy task.

What happens when filler turns gray? The actual grayness itself will be due to one of two things, or both. The first is precipitation by the filler of nitrocellulose or

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Here's just the material for your post-war product finish . . . a tough piece of goods that will stand up under the most severe conditions. Protects as no ordinary lacquer will do! It produces a splendid transparent finish of full depth on maple, walnut, gum, mahogany and other cabinet woods. Available in either the clear Gloss Rubbing or the Satin Finish. Economical; gives plenty of coverage; dries quickly. Mar Proof Lacquer Sealer is recommended with it for the first coater.

Cannot be marred or scratched — just thumb nail it; try to scratch or mar it.

Send for FREE WORKING SAMPLES

A Schaefer Mar Proof Lacquer finish will give you the best start in this most critical period. Use this tough mar proof lacquer, and obtain satisfaction right away. Working samples furnished without obligation. Write for them!

THE SCHAEFER VARNISH COMPANY, INC.
Louisville, Kentucky

MAR PROOF LACQUER

resin from lacquer sealer or lacquer coats applied over it. The second is too little oil or binder in the filler, or improper wetting of the filler by the sealer. Any dark pigment, even in a black enamel, will turn grayish if there is not enough oil or resin to completely wet the pigment when the film is dry.

With these facts in mind, we can now look at several things that cause gray filler. The most common is *lack of drying of the filler.* Most wood fillers, even some of the fast drying ones, contain quantities of slow solvents which, if not completely removed, can precipitate some of the solids from lacquer coats. Even overnight air drying may not be enough to remove these solvents if drying conditions are poor. There should be enough heat (at least 70° F.) and air circulation about the filled surfaces if the filler is to become bone dry. Even in a room that is warm enough, poor circulation can cause vapor pockets which prevent filler from drying. If these poor drying conditions cannot be corrected it would be wise to switch to one of the newer synthetic fillers that can be coated safely within 30 minutes, in spite of the higher cost of the material.

A second cause of gray filler is the use of the wrong thinners to reduce the filler to brushing or spraying consistency. *Do not use kerosene for this purpose.* It is far too slow for ordinary drying schedules and will cause gray filler. Use light naphtha, and slow it down with mineral spirits if necessary—never kerosene. Also, with the new 30-minute fillers, do not use any mineral spirits. Use only the reducer supplied or recommended by the manufacturer.

A third cause of gray filler is the bad habit some workmen have of adding a little raw linseed oil to filler to make it work easier. This oil may cause serious spotting and graying trouble. If the filler is too fast and requires slowing down to work easier, add a little mineral spirits unless it is to be coated at once. In that event, consult your supplier, who can furnish a special thinner or retarder for the purpose.

A fourth case of gray filler is too little oil, resulting in insufficient wetting of the pigment particles. This condition may occur in the furniture plant where the paste filler may have stood undisturbed for several months, resulting in some of the liquid vehicle coming to the top. If you dig out the paste from the bottom without mixing in this liquid on the top, it may have too little oil. Another cause related to this is failure to use a wash coat on the wood before filling. The raw wood may sometimes absorb enough oil from the filler in the pores to cause it to turn gray, especially with soft and porous woods. Wash coating, of course, is the answer.

A fifth cause of gray filler is improper formulation on the part of the manufacturer. He may have made a mistake. On the other hand, you may be using a filler that was not intended for the purpose to which you are putting it. Perhaps another filler from the same supplier will stop your graying trouble. In any case, consult your regular supplier first, laying the whole matter before him. He can then advise you what to do, or perhaps make a special filler to suit your conditions.

A sixth cause of gray filler is, strange as it may seem, improper choice of sealer. If the solvent combination in the sealer is fast

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QUALAVITE has been formulated to produce a finish that will positively resist the ravages of alcohol, water, moderate heat, abrasion, impact and will not scratch white seven days after application. This super lacquer has been laboratory tested to stand the "gaff." It is hard and retains its flexibility and permanency indefinitely. QUALAVITE is as modern as the atom bomb. If you do not know QUALAVITE 100E, then your use of it will prove its efficiency. Write for quotations.

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or lean it is much more likely to turn gray over the pores. The reason is that the slow, rich solvents are better able to hold the resins and nitrocellulose together in the presence of traces of such non-solvents as heavy petroleum solvents and linseed oil. Also, if the sealer has a high proportion of nitrocellulose it is more likely to turn gray over the filler than otherwise, other things being equal.

Bleeding of the filler is often related to poor drying. If solvents remain in the filler when it is sealed over, the sealer penetrates into the filler in the pores and lets these solvents come out into the wet sealer. Naturally, any soluble coloring matter will come out with these solvents, and will cause spots around the pores. Some fillers are more likely to bleed than others because of their makeup. Also, if you put on a heavy coat of sealer and it stays wet too long, it will cause bleeding and swelling of the filler. This is especially likely to happen on damp, muggy days when drying is slow. If the filler is thoroughly dry, and the sealer dries in normal time, there is little danger of bleeding, regardless of how and by whom the filler is made.—X.

The fact that the filler sometimes turns gray and also bleeds, is an indication that the filler is not sufficiently dry when you start lacquering. If it were dry, it would not bleed up into the lacquer film. You say that you use a quick-dry filler, but you do not mention what you use as a reducer and at what reduction the filler is applied.

Granted that the filler is made by a good reliable manufacturer and is really a quick-drying filler (2 to 4 hours) the first thing to do is to check on the reducing medium. If V.M. & P. naphtha or benzine is being used you should have no trouble. You should check carefully to make sure that none of your employees is adding any retarding solvent such as boiled linseed oil, raw linseed oil, oleum spirits, turpentine or kerosene.

I have serviced many accounts where, after a check of all cans and bottles in the filler section of the finishing room, I found various kinds of these solvents that the men would add to the filler mix so as to make it easier to wipe—easier on themselves, that is.

Here is a test you can make: Be sure to open a new can of filler. Reduce only with recommended thinner in the proper proportions as recommended by the filler manufacturer. When thoroughly mixed, brush on to a test panel as you do in regular production. (Make the panel a large one). Let dry one hour and spray a small section of panel with sealer; let dry two hours and spray another small section of panel with sealer; let dry four hours and spray another small section of panel with sealer; let dry eight hours and spray still another small section of panel with sealer; let dry overnight and spray a final small section of panel with sealer.

Next day observe the sealer over the five different sections of the panel. If the section with only one hour of drying bleeds and is gray then it is obvious that the sealer was put on too soon. Check the other sections too. If none of them has turned gray or bleed, the filler and solvent have proved to be okay. If the one, two and 4-hour sections have turned gray, but the 8-hour and overnight sec-

INDUSTRIAL FURNACES

OVENS • MELTING FURNACES
INDUSTRIAL HEATING FURNACES

MELTING FURNACES—for melting aluminum and magnesium. Electric, gas or oil fired.

Designs by Campbell-Hausfeld, Fisher, Strasbaugh and others.

OVENS—for baking lacquer, enamel, synthetic resin, japanning, for low temperature metal heat treating, for drying and curing chemicals, rubber, paper, lithographing, plastics, ceramics, etc.

Made by Despatch, Gehnrich and Gehnrich, Hoehler, Young Bros., W. S. Rockwell, Surface Combustion, Parkson, General Electric, Stewart and others.

INDUSTRIAL HEATING FURNACES—
Continuous and Batch Type
Rotary Hearth
Tunnel Type
Box Type
Atmospheric Control Type

Made by these well-known manufacturers: American Gas Furnace Company, Despatch, Despatch Furnace Company, Electric Furnace Company, Gas Machinery Company, Industrial Heating Equipment Company, Ingersoll-Rand, Lindberg, Whiting Corporation, General Electric, and many others.

These furnaces are products of the best American manufacturers. They have recently been declared surplus and are now ready to take their places on industry's production lines, to be counted again among the country's industrial assets. Every furnace is priced far lower than you have ever thought possible. Now—this very day—is the time to learn the details concerning the furnaces offered. Write, phone or visit your nearest WAA Regional Office.

Principal inventories are located at Boston, New York, Philadelphia, Richmond, Cleveland, Detroit, Chicago, St. Louis, Minneapolis, Cincinnati. However, any WAA Regional Office is prepared to give complete information and arrange for purchase. All furnaces offered subject to prior sale.

All furnaces are sold under existing priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area, and then to purchase the materials offered herein.

Exporters: Your business is solicited. If sales are conducted at wholesale levels, you will be considered as a wholesaler. Any inquiries regarding export control should be referred to Office of International Trade, Department of Commerce, Washington, D. C.

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533-2

tions did not, then the filler is not as fast a dryer as is claimed; it needs longer drying time before sealing.

Another good test for filler drying is to take the same mix as was used for the foregoing test and brush it on an area of about 12-in. square on a piece of glass. Go back to the filler on the glass each hour and try to scratch some off with your finger nail. When the time is reached where you can not scratch it off easily and the filler is hard, with a slightly sandy surface which leaves only a mark on the surface when scratched, then the filler is thoroughly dry.

When all of this has been done and the filler still appears to turn gray and bleed, then it's time to look at the lacquer coats, and most of all the sealer. If the sealer is sprayed in a reduced state, try spraying without reduction, leaving out the thinner as a possible cause of the trouble. Some thinners are very strong in these days of solvent shortages and the thinner may be the cause of your trouble.

If the sealer is sprayed straight (not thinned) and still the trouble persists, try another make of sealer or try using a clear gloss top coat lacquer as a sealer only for the test. If the other sealer or the gloss lacquer do not cause the trouble, then the trouble lies in the sealer.

Don't overlook the moisture content of the wood being finished. Have it checked, as this can cause gray pores by preventing the drying of the filler in the specified time. At times I have seen trouble of this sort appear on certain veneered panels that were glued with resins which evidently had some retarding action on the filler. In the same piece of furniture, where a different type of panel was used, the finish was perfect, so there was no fault in the finishing materials.—EDWIN HOGSTROM.

(Suggested by H. R. Madson)

Outside Man: I need a ladder so I can inspect the top of this oven.

Inside Man: If you find one, let me know where it is; I've been trying to find one for a long time.

How is This Fabric Colored?

We are sending you a sample of fabric with colors of red, yellow and a trace of blue-green in a swirl pattern (see accompanying cut). We are wondering by what process this material was printed? Can you give us directions for duplicating it?—V. Studios.

EDITOR'S NOTE: Most of the color goes clear through, but one side shows a stronger more brilliant color and this side feels slightly like a waxed surface. We referred this to Paul Blackmore

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Durable light-proof wood lacquer for interior and exterior use.

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Red is the predominant color. Yellow is strongly in evidence too. There are slight traces of blue which, where it mixes with yellow, shows green.

of Interchemical Corp., who makes the following comment:

In my opinion, the cloth was not printed at all. I believe the design was imparted to the cloth by floating thin films of lacquer on water, partially intermixing them to form the variegated design, and then transferring them to the cloth by causing the surface of the cloth to skim the film off the surface of the water.

This process is not widely used, although it has been known for a number of years. It is difficult to get any kind of uniformity of pattern by this method, but in some instances the lack of uniformity may be desirable, because you never get two pieces of cloth that are exactly the same.

The process is very much like that used in coloring Easter eggs. A suitable receptacle for the water is provided and the lacquers are fed onto the surface of the water drop by drop and caused to intermix, the rate of influx being adjusted to equal the speed at which the film is picked up by the cloth. Usually the cloth passes over a roller that causes it to dip just under the surface of the water. The lacquers dry almost instantly but an additional drying cycle is needed to cause the water to be removed from the fabric.

A number of years ago we developed a piece of apparatus for producing this effect on cloth and paper continuously, but we did not consider it too practical or foolproof and therefore did not make any attempt to push the sale of the product. We have so-called water dip lacquers which we are in a position to sell and could probably offer some suggestions for an apparatus to make them work—provided the volume is large.

Chinese Tung Oil Coming Back

CHINESE TUNG OIL was first called "Chinawood oil" by Marco Polo back in the 14th century when he found it used in the making of fine lacquers and enamels, in the course of his travels in ancient Cathay. In this country it is called either "Chinawood oil" or "tung oil," with the latter designation preferred.

Prior to World War II, tung oil which was widely used in the paint, varnish and lacquer industry for the formulation of many specialized finishes, was practically cut off from international commerce, due to the activities of the Japanese in China. Following the Japanese occupation of China, this country's imports of tung oil progressively dwindled, until by 1942, imports had fallen from 175,000,000-lbs. of oil in 1937, to 8,000,000-lbs.

Now the Chinese oil is again arriving in this country, but in relatively small quantities. In mid-1946, it was estimated by the Wall Street Journal that only 10 million to 12 million pounds had been received from China during the first half of the year, and that total receipts from China for the full year of 1946 would not total more than 26 million pounds, if that much.

In order to expedite output of tung oil in China, where for centuries the extraction has been by the primitive method of crushing the tung kernels in a wooden trough, the Wall Street Journal reports that a San Francisco firm has sent a modern tung crushing mill equipment to China, complete with storage tanks, riveting machines, barges and tugs.

Earle L. Rauber, in a recent survey of the tung oil industry in "The Chemurgic Digest" says that there are now 12 tung oil mills in the United States—three in Florida, four in Mississippi, three in Louisiana, one in Alabama and one in Georgia. However, the last mentioned has been reported as being recently moved to Florida.

In the 1944-45 season these mills expressed a total of 10,473,700-lbs. of tung oil, or about a tenth of the pre-war normal needs of the paint, varnish and lacquer industry. While considerable quantities of tung oil are normally used in the linoleum, printing ink and other industries, the paint, varnish and lacquer industry has long been the major user.

The National Paint, Varnish and Lacquer Association, which for many years has been keenly interested in the experimental development of tung tree orchards in the southern part of the United States, has made clear that many of the experimental orchards planted did not turn out well and that the yield of tung fruit is dependent upon numerous factors, including climate. Frost and moisture conditions which vary from year to year, topography, chemistry of the soil, drainage, orchard management and harvesting practices all have to be considered.

In appearance the tung fruit, which is not edible, resembles a large brown walnut with the husk on, or a russet apple. The fruit grows both singly and in clusters, according to the variety of the tung tree.

Inside the pulpy covering are from three to five seeds or kernels. It is from these seeds, kernels, or nuts as they are variously called, that the tung oil is expelled at the mills. —N. P. V. & L. A.

Materials Supplies Equipment

New Interchemical Finish Resists 500° F.

A new heat-resistant baking enamel called "Polytherm," which is capable of withstanding temperatures of more than 500° F. without yellowing, is announced by Interchemical Corp., Finishes Division, 350 Fifth Ave., N. Y. 1.

Polytherm, although different in formulation and structure, is as easy to apply as any other enamel. It sprays at extremely high-solids content, and bakes to a hard, smooth, lustrous finish with excellent hiding qualities, high gloss and freedom from orange peel.

Polytherm finish shown at the Exhibit of the Institute of Cooking & Heating Appliance Manufacturers.

In addition to its exceptional heat resistance, Polytherm has remarkable color retention, is unaffected by hot fats and grease, and is immune to most chemicals, including alkali. Should Polytherm-finished surfaces be damaged by abuse or careless handling, they can be re-finished easily in the field.

Polytherm enamels are made in white, black, and colors. Within reasonable limits, color is no problem; any shade can be matched to suit individual needs. The first announcement of Polytherm was made in December 1946, at the Exhibit of the Institute of Cooking and Heating Appliance Manufacturers, where demonstrations of its ability to withstand temperatures up to 500° F. attracted considerable attention.

New Emulsifiable Cleaner

Emulsion Cleaner EC-75 is a new development in emulsifiable solvent cleaners. It has the solvent powers of aliphatic hydrocarbons and, at the same time, is emulsifiable in water. It will not harm alkali cleaners when it is dragged into them. In fact, it actually increases the effectiveness of alkali cleaners. No fatty acid soaps are used to cause difficulty due to poor rinsing.

Cleaner EC-75 is used as a presoak to remove oil, grease and buffing compounds, as well as solid dirt from all types of metals. After the EC-75 soak, the work is rinsed with running water or a

water spray. EC-75 will emulsify and carry away oil and inorganic material. The work can then be cleaned chemically and physically with only a short soak in an alkali cleaner. The use of EC-75 insures removal of solid dirt which does not come off by alkali cleaning, and it greatly shortens the time of cleaning in the alkali cleaner. Recesses and crevices are thoroughly cleaned.

EC-75 is not used mixed with water, and water should not be allowed to enter it because water lowers its solvency. The material is a penetrating solvent to replace naphtha, kerosene and chlorinated solvents and, in addition, it has high detergency and emulsifiability. This cleaner is a product of Enthone, Inc., 442 Elm St., New Haven, Conn.

Produces Antiqued Effect on Plated Silver

The Hanson-Van Winkle-Munning Co., Matawan, N. J., announces a new material for producing a rich oxidized or antiqued effect on sterling and silver-plated products. No electric current is required. The work is simply immersed in "Platin-Nig" solution, prepared according to simple directions. The parts are then high-lighted for striking light-and-shadow relief. "Platin-Nig" heightens the quality appearance of silver products.

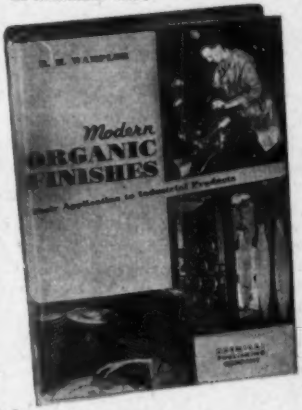
"Ucilon" Coating for All Corrosive Conditions

"Ucilon" is an organic coating material especially formulated to protect metal surfaces which are subjected to corrosive conditions. The coating withstands acids, al-

NEW BOOK

(452 Pages)

Descriptions of modern finishing materials and equipment for their application, drying and conveying are presented so that the reader may have an over-all picture of modern industrial finishing operations. Throughout, the main emphasis is on proper selection and use of materials and equipment to get the best possible finish at minimum cost.



Contents:

Sec. I. Modern Organic Finishing Materials—3 chapters.
Sec. II. Modern Application Methods—5 chapters.
Sec. III. Drying Methods — 3 chapters.
Sec. IV. Product Handling in the Finishing Department—1 chapter.
Sec. V. Finishing Processes—11 chapters.
Sec. VI. General Considerations—2 chapters Bibliography and Index.

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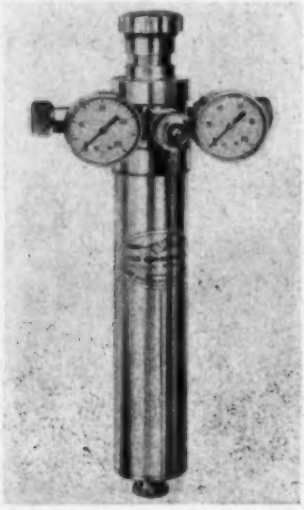
Industrial Finishing

1142 N. Meridian St., Indianapolis 4, Ind.

kalis, alcohol, salts, oils, gasoline, etc. It is available in white, black, gray, green, clear and certain special colors; can be applied by brushing, spraying or dipping. May be air dried at room temperature—but for maximum adherence and protection it should be baked at 200° F. "Ucilon" is a product of United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.—or Detroit 7, Mich.; Chicago 4, Ill.; or Los Angeles 11, Calif.

Black Arrow Air Conditioner

The Black Mfg. Co., Baltimore 23, Md., is now shipping as standard equipment with all Black Arrow Paint Spray Outfits, a newly developed air conditioner which, the manufacturer claims, offers users several desirable features. This air conditioner is standard-equipped for 2-gun operation. It passes 30-cu. ft. of air per minute at 60-lbs. operating pressure. Long life is assured by use of an oxygen-type forged brass regulator and an extruded aluminum tube.



This air conditioner is Model N-200.

Since the regulator itself is the heart of any air conditioner, all parts are designed and machined to handle many times the working pressures required in normal service. The use of an extruded aluminum tube instead of a steel tube eliminates the possibility of rust and corrosion. All outlet fittings are ¼-in. standard pipe thread. Inlet fitting is ⅜-in. pipe thread.

Spot Enamel Stripper

Enthone, Inc., Dept. IF, 442 Elm St., New Haven, Conn., has developed a new spot enamel stripper designated as Enthone Enamel Stripper S-45 for removal of synthetic enamel and other coatings. This stripper is recommended for stripping enamel from large parts that can not be immersed in a stripping solution.

Stripper S-45 is a slightly viscous liquid that can be brushed, sprayed or applied by dipping to the work to be stripped. It contains a non-waxy evaporating retardent that keeps the stripper on the work until stripping action is completed. Stripping is accomplished by a wrinkling action so that the enamel can be brushed, wiped, or scraped off. No waxy residue is left to interfere with adhesion of subsequently applied finishes.

The stripper has fast action on most synthetic enamels as well as certain nitrocellulose coatings. It

Mac's FASHION FILLERS & STAINS

AT THE RECENT Furniture Shows Mac's Fashion Bleaches on some of the bedroom and dining room suites attracted considerable attention and much favorable comment.

Mac's Rapid-Dri Fillers and Stains gave these suites a color that possessed unusual life which greatly enhanced their attractiveness.

A color matched sample panel will demonstrate the difference. Write today.

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NON-INFLAMMABLE

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I. C. D. FORMULA 9 is the standard of safety and quality . . can be sprayed or brushed . . doesn't raise grain nor discolor . . quickly removes all kinds of finishes and coatings from any surface or material . . costs less to use . . saves time, labor and material.

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is not satisfactory for linseed oil paints, pheno-formaldehyde enamels or vinyl type coatings. Modified urea-formaldehyde, melamine, and alkyd coatings are rapidly stripped. The stripper has no harmful action on metals, plastic, or wood.

Metal Cleaning Machine

The Mabor Company, Clark Township, Rahway, N. J., has produced a turntable type of washer which both rinses and dries average sized parts in baskets, trays, or individually. This unit requires only one operator to load and unload the parts for cleaning. In addition, the turntable washer is completely self-contained, compact, efficient, and requires little floor space in which to achieve substantial production at an average of 60 baskets per hour.

The turntable washer is available in three standard sizes and may also be had with special modifications for difficult and unusual problems, where centering of parts is essential. It may be heated by steam, gas, oil or electricity.

'Phenoglaze,' Durable Coating For Wood or Metal

Phenoglaze, a phenol-formaldahyde protective coating manufactured in England for use on all types of wood and metal products, is now available to fabricators in this country through Phenoglaze Sales Corp., 315 Broadway, New York 7, N. Y.

Exacting tests have established that this plastic film is impervious to heat, moisture and chemical action such as that of salt, gasoline, oil, alcohol, turpentine, acetone, and other corrosive agents. It also offers complete protection against termites, marine borers, cosmetics, cigarettes and contraction and expansion caused by extremes of temperature.

Phenoglaze is applied by spray, brush or dipping. It comes as a clear coating and also in colors. Its high resistance to galvanic influences, to acids and alkaline solutions, makes it an excellent finish for such products as furniture, station wagon bodies, wood or steel boats, radio cabinets—wherever its unique properties of protection and attractive appearance are required. An important feature is the fact that Phenoglaze penetrates into wood and becomes an integral part of the surface. It is air-drying and cold-setting.

Plating-Rack Coating

An odorless, non-inflammable plastic rack-coating, which can be applied in any plating plant without special precautions, is announced by Peninsular Chemical Products Co., Van Dyke, Mich.

Known as Pen-Kote 590, this material consists of an aqueous dispersion of Saran plastic and contains no organic solvents. It is tough, flexible and highly resistant to all plating and cleaning solutions, including chlorinated degreasing solvents. It is applied by hand dipping and dries in less than an hour at room temperature, giving complete protection 24 hours. Because it is an aqueous dispersion rather than a solution, it is exceptionally free-flowing, draining rapidly without forming webs or strands to be trimmed off after dipping.

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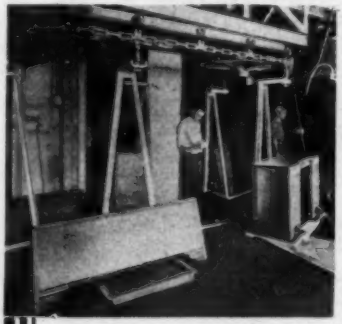

INFLATION

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Plants with modern Palmer-Bee Materials Handling Systems are prepared to meet competition in any market because they can produce at least as profitably as any of their competitors.

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Booklets Catalogs Circulars

Polishing Machinery Book

If you are interested in machines for polishing—buffing lathes or arbors, abrasive belt finishing, etc., send for catalog No. 55, published by Hammond Machinery Builders, Inc., 1600 Douglas Ave., Kalamazoo 54, Mich. The book contains 20 attractively illustrated pages 8½x11-in.

Free Paint Brush Booklet

In an effort to clear up in the minds of many in the painting crafts a number of questions concerning what nylon paint and varnish brushes will and will not do, the Wooster Brush Co., Wooster, Ohio, has brought out a new illustrated booklet printed in two colors. This booklet is the result of many months of painstaking tests, experiments and research.

With the continuing scarcity of high quality Chinese bristle, The Wooster Brush Co. feels that there is unusual interest throughout the trade in nylon brushes. Even with the return of more Chinese bristle to the market, nylon paint and varnish brushes have certain advantages over bristle brushes in certain types of work.

Handling Flammable Liquids Easily and Safely

War-time developed safety devices for reducing fire and explosion hazards are illustrated and described in a new 2-color catalog published by The Protectoseal Co., 1920 S. Western Ave., Chicago 8, Ill., manufacturer of gasoline safety cans, cans for oily waste, etc. Widely used protectoseal products carry the support of leading fire-prevention experts as well as the approval of both Underwriters' Laboratories, Inc., and Associated Factory Mutual Fire Insurance Companies. Write for your free copy now.

Infra-Red Parade

User evidence, showing how infra-red drying installations are working for representative concerns in 17 cities, is revealed by pictures and facts presented in a 2-color 12-page booklet published by The Fostoria Pressed Steel Corp., Fostoria, Ohio. Six features of the company's "Even-ray" equipment are described. Page size is 8½x11-in. Send for a free copy if you are interested.

Metal Cleaning Bulletin

An 8½x11-in. 8-page bulletin that illustrates and describes several sizes and types of degreasing machines, is published by Mechanical Process Co., South Orange, N. J., manufacturer of this equipment. Copies are free.

New Mahogany Book

The sixth edition of "The Mahogany Book" follows the tradition of all of the Mahogany books as to size and format. It has a new cover design and the usual color plates of the various types of figures found in mahogany. These plates are of great value in the trade because it is much easier to say, "I want Mahogany veneer like figure 3 in The Mahogany Book," than it is to attempt to describe a particular figure.

The illustrations in the book have been changed wherever a better picture became available. In text, such changes were made to bring the book completely up to date. Modern design also is emphasized more than in previous editions.

The book is published by the Mahogany Association, Inc., 75 E. Wacker Drive, Chicago 1, Ill.

Solvent Book Free

"Solvents, Alcohols, Extenders" is the title of a new 64-page book compiled and published by The C. P. Chemical Solvents, Inc., 60 Park Place, Newark 2, N. J.

This is the third edition of "Solvents, Alcohols, Extenders." It was prepared by the technical staff of The C. P. Chemical Solvents, Inc., in collaboration with the technical and sales staffs of the producers for whom The C. P. Chemical Solvents, Inc., has been functioning since 1925.

This handbook has been requested

and used all over the world by manufacturers requiring in their processes the materials which are described and for which specifications are given. The book has plastic ring binding so it opens flat; page size is 5½x8½-in.

Hot Spray Lacquer Book

Interested in hot spray lacquer? Pierce & Stevens, Inc., 710 Ohio St., Buffalo 3, N. Y., has prepared an attractive and informative booklet on the subject. Pages are 8½x11-in., bound with plastic rings, between heavy blue covers. Quoting from the book:

"P & S hot spray finish offers extra richness in appearance and improved durability when compared impartially with multi-coat finishes of equal thickness."

Information About Aluminum

If you are interested in authoritative practial information about aluminum, send for "Technical Advisor," a monthly technical paper devoted to publicizing latest recommendations on how to use aluminum mill products most effectively. The periodical is sent free. Write to Technical Editorial Service, Reynolds Metals Co., 2500 S. 3rd St., Louisville 1, Ky.

Bulletins on Wet Spray Booths And Dust Collectors

Two colorfully illustrated industrial bulletins, each 8½x11-in., have been published by Peters-Dalton, Inc., 17900 Ryan Road, Detroit 12, Mich. Bulletin 201 takes up "Hydro-Whirl" spray booths. Bulletin 101 reveals drawings, photographs and engineering data about "Hydro-Whirl" wet-type dust collectors. Copies of one or both bulletins are free.

Front covers of the two bulletins.

Chlorinated Rubber Book

Hercules Powder Co., Wilmington, Dela., has issued a new technical book on "Parlon," the Hercules chlorinated rubber product which, before the war, was widely used as a base in paints for concrete and other surfaces exposed to action of chemicals, gases, moisture, mold growths, and other destructive agents.

The shortage of natural rubber during the war prevented the manufacture of Parlon. However, protective coatings containing Parlon were subjected to considerable testing during the past few years and the information resulting from these tests is contained in the new Parlon book.

The book contains many new starting formulations as well as the results of long-time exposure tests of Parlon finishes. It is divided into two sections—properties and uses.

Parlon finishes discussed are alkyd enamels, finishes for alkaline surfaces, paints resistant to chemicals, varnishes, traffic paints, furniture finishes, marine finishes, and emulsion paints.

Accident Prevention Manual for Industrial Operations

After 2½ years of research and preparation, the National Safety Council has published its new "Accident Prevention Manual for Industrial Operations," which the Council believes is the most comprehensive treatment of the fundamentals of safety available in one volume.

The 544-page manual, containing 400 illustrations, charts and tabulations, is intended as a handy and authoritative source of accident prevention information for safety directors, safety engineers and foremen. Each of the 14 major divisions of the book is preceded by a summarizing index for quick location of general topics, while a 12-page detailed alphabetical index at the back gives access to details.

The 14 major subjects covered are: plant design and layout, construction and demolition, permanent equipment and facilities, guarding and operating machinery, materials handling and storage, electrical hazards, chemical hazards, fire and explosion hazards, flammable liquids, hand and portable power tools, commercial vehicle operation, personal protective equipment, industrial hygiene, and safety organizations and programs.

The manual is available to both members and nonmembers of the Council. Further information may be obtained by writing the National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill.

Industrial FINISHING

Distributed Monthly to finishing room and paint shop foremen, production superintendents and company officials of metal-working, woodworking and miscellaneous industrial plants where production cleaning and finishing are major operations in parts and products manufacture.

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Editorial

Survey Reveals What Equipment is Used

In order to obtain some information about the industries it serves, Industrial Finishing Magazine prepared and sent out about 2400 questionnaires recently. Only a few questions were asked, and return envelopes were supplied, so it was easy to fill out the blank spaces and send back the filled-in forms. Nearly 500 of them were returned. They came from a fair cross section of the industries that read this publication—small, medium-sized and large firms manufacturing products of metal, wood, plastics, fiber and fabrics—with some concerns doing custom finishing.

Figures compiled from these returned questionnaires indicate that the average number of employees in finishing departments is 39. One third of the companies reporting have an average of three water wash spray booths each. About 86% of the companies have one or more dry spray booths, the average being nearly four dry booths per finishing room. Nearly all companies reporting use spray guns, the average per finishing room being 10.2. Looking over the various returns, it is noticed that in most instances each company has several spray guns for each spray booth and each operator.

More than half of the firms reporting have dip tanks, the average being 2.9 tanks each. About half of the finishing rooms have convection baking ovens, but only 25% have infra-red ovens. More than 1/3 of the finishing rooms have conveyor finishing systems. One company in Michigan reports that it is "trying to work one out, but it is tough going." Naturally, the design and installation of a conveyor system should be intrusted only to a reputable concern that has experienced engineers to handle the job. A firm in Oakland, California, writes a note to the effect that it is "at present building a new plant in which a conveyor will be installed, and all material will be pumped through pipe lines from a separate

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(The Original)
INFRA-RED GAS BURNER

DRY 4 COMBINES PER HOUR

Recently praised by Fortune Magazine for its extraordinary efficiency, Massey-Harris, Ltd., Toronto, has now installed two Salem Engineering ovens equipped with Burdett Infra-Red Burners, thus joining thousands who know . . . Burdett Infra-Red Burners save from 33⅓% to 76⅔% drying time.

This oven is 60' x 15' x 15½', drying 4 combines, approximately 33,200 lbs. of steel, per hour at 190°F.

Floor conveyor speed is 1.7 feet per minute. These revolutionary results can apply to your drying, baking, cooking and similar processes. Ask for complete data.

3425 West Madison Street, Chicago 24, Illinois

BURDETT MANUFACTURING CO.
Infra-Red Gas Burners

SUNBRITE

SUNBRITE MFG. CO.
Formerly the Mitchell-Mayer Co.

ALUMINUM PAINTS
BRONZE POWDERS
GOLD POWDERS
CHROME-TYPE ALUMINUM PAINT

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storage building." Fine; this is the modern trend.

"We are working on this," says a concern in Tacoma, Wash., pointing to "force drying departments" and "conveyor finishing systems," as listed on the questionnaire. A furniture manufacturer in Illinois writes that a "conveyor, three drying ovens and eight booths are now being installed." A steel products company in Buffalo, N. Y., writes: "We are installing a new setup with automatic degreaser, three water wash spray booths and a new infra-red oven."

A few companies indicate that they are using roller coating machines in their work. Others mention use of tumbling barrels.

On the basis of these returns and considering various conditions that affect the cost and volume of production in various factories, it seems apparent that excellent opportunities exist for the sale and installation of more water-wash spray booths, more drying ovens or accelerated drying setups, and more conveyor systems. Conveyorization, especially, is desirable and profitable wherever a considerable volume of similar work is performed. It saves labor, keeps work off the floor and off trucks, establishes steady continuous production, and cuts down the possibility of finished surfaces being damaged or marred along the coating-drying production line.

DeVilbiss Spray Painting School for Finishers

The DeVilbiss Co., Toledo, Ohio, will conduct three one-week courses in the first half of its 1947 School of Spray Painting for industrial finishers. These will start March 10th, May 12th and June 23rd, each covering the same classroom instruction and shop work. Courses are given without charge to users of DeVilbiss spray equipment. All interested should write for reservations well in advance.

High Costs; Checking Wasteful "Leaks"

★ Are your bills for finishing materials becoming high enough to demand attention? Finishing materials cost more now; some of them a lot more. Ever check into how much material is being wasted in your plant? Very likely a careful investigation will reveal many places where a needless wastage of materials can be prevented, thereby resulting in savings which will help to offset those increased costs. Reminds me of an awakening experience I had last summer.

I received the regular water bill charged against my home. Upon reading it I took off my glasses several times and wiped them and blinked my eyes. I had my family read it to make sure that I was seeing the figures correctly. My monthly bill generally ran $2.00 to a maximum of $3.25 for the past year and a half. This one was for the sum of $15.35, almost five times the highest previous figure. I got into my car and shot down to the water department prepared to explode with fury. Neighbors who had automatic sprinklers had watered their lawns for hours at a time every day; I had watered mine for only about half an hour in the morning and half an hour at night. How could I rate such a high bill? Impossible!

So I got a hold of the superintendent of the water department

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and started to proclaim my rights as a citizen, tax payer and such stuff. He looked up my past records and admitted that the last bill was high.

"We will send a man out to your home to check the water meter and see whether there is anything wrong with it," he said. "Meanwhile you do your own checking up on the inside and outside of the house and see whether there is a leak any place in the plumbing. Especially look in the bathroom at the toilet bowl. Watch the float level of water in the tank and see whether the water remains at least an inch below the top of the overflow pipe."

Accordingly, I drove home and started to check for leaks in the plumbing system. Everything was in good order until I came to the toilet bowl tank. Sure enough, the water was all the way up to the overflow limit and was flowing in small quantities down the sewer. I worked for half an hour and got the level an inch below the overflow and made sure that it would remain at that level without overflowing down the drain again. Then I looked into a book on my water meter and learned that with our city water pressure of 60-lbs., a small leak of 1/32-in. diameter would lose about 6,333 gallons of water a month; and a leak of only 1/4-in. in diameter would lose 300,000 gallons of water per month. Holy mackeral, what figures. If you have ever been amazed by figures, these are figures to be amazed at.

Now in regard to the finishing departments throughout the country, I wonder how many small and large leaks there are in the use of paints, lacquers, varnishes, thinners, stains, fillers, etc.? And in lost heat in ovens or drying

rooms? And in inefficient equipment; incompetent or indifferent help? Then there are tremendous wastes through inefficient exhaust systems which perhaps were good 10 or 15 years ago, but are now lame ducks; incorrect pressure and loss caused by careless overspray of paints; hundreds of thousands of leaky faucets throughout the country dripping their contents in little puddles under the paint drums; millions of gallons of thinners evaporating every second through open drum bung holes and elsewhere.

These are unseen and unnoticed losses but they run into high figures. These are the bills you pay for, but don't get. These are those unseen hidden industry wreckers. I got a direct bill and went out to correct the hidden loss. Are you doing it? Try it today. Check every faucet in your plant. Notice how many coats of paint the floors under the drums have. Notice the little puddles of drip from paint drums. Notice where the thinners have discolored the floors, and then do something about it yourself. I would like to hear more comment on this.—Norman Abramovice.

Planning Ahead

★ Many ideas, to come into being within the next year or so, will play a great part in the finishing departments of our modern industries. The reason for these ideas lies in the fact that any businessman of consequence will always try to plan ahead. In other words, the wise executive has not slept and waited for his competitor to

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beat him to the next step in improvement in production methods. He has spent a great deal of time with his finishing men and his various sources of supplies, such as paints, sandpaper, spraying equipment and mechanized systems, in trying to fathom the future and laying away a store of knowledge on the trend of this industry.

Of course this executive has only a certain amount of time to give to the direct running of the plant, but he has given out assorted details of a research nature to his finishing group and they, in turn, do the leg work and turn in a summary of their opinions.

This idea of planning ahead for various contingencies, whether of immediate need or filing away ideas for future conditions, is the sign of an alert finishing man. The executive who is doing this kind of investing, even if he does it all himself, without detailing it out to the finishing heads, is the kind of a man on whom the industry stands—the cornerstone of the finishing art, now and in the future. He is the man who will still be in business when others are falling by the way side.—A. N.

Future Wood Finishes; A Foreman's Forecast

★ In the Pacific Northwest, softwoods such as pine, fir, hemlock, spruce, and the less desirable hardwoods such as cottonwood, are now used extensively in the production of furniture due to an inadequate supply of more desirable lumber. These softwoods are not durable woods for furniture—but there are chemicals available which, when applied to softwoods by im-

mersion for several days, make them impervious to expension or contraction. This chemical treatment makes those softwoods harder in texture than northern red birch, maple or hickory.

I have experimented with one of these chemicals in order to substantiate this statement. However this chemical makes the use of present stains ineffective. It also leaves the wood with a reddish cast. That one of these chemicals or a modification of same will eventually be used is practically certain, but it will further complicate the task of the chemist who formulates finishing materials, although he will ultimately succeed.

Finishing materials of the future, I believe, will embody all of the niceties that the most exacting users may desire. I can visualize conveyors without attendants, except those who handle articles on and off the traveling automaton, or those who are needed to check the functioning of the equipment. All finished pieces will be identical in color and body. Stains and coatings will be unaffected by light, heat and moisture. The film will be thicker than the present applications. Only one coat will be needed. It will be as hard as glass and will have excellent adhesion and durability. It will be certified and guaranteed by some reliable agency, and this guarantee will embody other materials and construction factors. The cost will be reasonable.

Instead of the thousands of coating formulas now in use there will be comparatively few. Standardization will be complete. Just as we now order and get standard bolts and nuts, regardless of source, so we will order, for example, stain application "No. 11,

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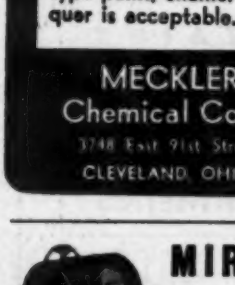

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series 1"; or finish application formula "A." Ultimately these formulas will be produced identically uniform. Sales service will be the controlling distribution factor. Furniture manufacturers will be able to show individuality of color and tone by blending say, stains No. 11, No. 14 and No. 15, series 1, in proportions to suit the effect they desire. The label on the article will indicate maybe "Stain Series 1 blend, Protection Coating formula C."

Finishing material manufacturers will be free of the worries and troubles caused by non-uniformity of raw materials. Production will not be disrupted by filling orders for small quantities of special formulas which often cost more than the sales price received. On one occasion a manufacturer showed me his file containing more than 15,000 formulas. He said that he was obliged to fill a multitude of 5-gallon orders at the drum price.

The furniture manufacturer will know exactly the material he buys and there will be no harmful reaction after his product has been used for a while. The public will know the inherent qualities of the respective standardized finishes. People may compare notes on formulas A, B, C, etc., and the warm effect of stain No. 7 on spruce lumber permeated with hardening and moisture proof chemical No. 101-X. There will be a great surge of replacement buying and capacity production volume will be assured for years.

This picture of the future is no phantasy. Its equivalent has occured in other industries; it is being developed in many industries and will eventually occur in all. —T. J. PIERRUNG.

How to Get Along With Workers

The modern foreman, besides knowing as much as possible about the material and production end of the business, must also learn one more very important thing. That thing is, the proper way to lead and handle his help. I have found that a great deal of labor difficulty and its companion trouble is caused by a direct act or thoughtless action on the part of a minor key man, or as some call this person, a "straw boss." These men are generally in the "in between" category, being vested with neither authority nor executive powers, but having a certain amount of limited responsibility in their department. They may be the foreman's or supervisor's leg men, or some other form of active participation in the production set up. As these men have no direct authority, they gradually build up a synthetic one. This often results in a crude dispatching of orders from the boss, and many times it is one of the main sources of friction in labor relations. The boss somehow, because he gets relieved of the leg work, will generally rely on this person and give him the unfair benefit of any doubts when there is a dispute. Thus a cause for grievance is born, and it is enlarged every time by this same straw boss.

We take it for granted that supervisors and foremen are capable of doing the various jobs under their jurisdiction and are also pretty well versed in the manufacturing end; but when labor relations, due to the stupidity of a straw boss, starts reaching the breaking point, the supervisor or the foreman has to face the music. Many firms have not taken

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their key men sufficiently into their confidence and explained to these men what the policy of the firm is. As a result, the foremen who are making an effort to create a good neighbor policy may find that they have gone too far either in appeasing labor or vice versa. —N. ABRAMOVICE.

Let's Avoid More Costly Fires

Waste of life and property by fire has increased so enormously and so swiftly that the problem extends far beyond the fire insurance business, or any other business or field. It has become a problem of critical national interest both economically and socially.

The appaling rate of destruction in fire losses commands the special thought and attention of every citizen interested in the social and economic welfare of our country. It is of particular significance to those who represent business and industrial organizations with extensive properties, stocks of goods and large values to protect.

Seven years ago the upward trend in fire losses began its climb. During the war years we explained it away by charging it to increased activity of industrial and mercantile operations, undermanned fire departments, obsolete and inefficient fire fighting facilities, and public preoccupation with the war effort. However, it has now been more than a year since cessation of hostilities. The trend in fire losses has continued unabated, resulting in destruction of material and supplies at a time when they are vital to the reconversion of our economy from a war to a peace basis.

Carelessness and recklessness are the principal enemies that we must constantly fight against. It is such a simple, non-technical problem as the careless use of matches and careless smoking habits which ranks first in the list of known fire causes, accounting for nearly 30% of all fires. We cannot blame the match or tobacco. Blame rests with the careless user.

Unfortunately, there has been a general let-down in the attitude of our people since the war's end. An attitude of indifference, or perhaps preoccupation, has generally replaced the spirit of alertness, caution and personal responsibility that characterized the prewar years. All of us must exert every effort to make the American people aware of the price of carelessness and recklessness—and to accept individual responsibility in preventing fires. — FRANK A. CHRISTENSEN, President of the National Board of Fire Underwriters.

Get More Production

★ I agree with a great many production minded men that one thing needed at the present time is production on the same order as during the war effort. Production units should not remain on a 40-hour week for the present time; they should be stepped up to a longer work week—until management knows that it can handle its shipments with a 40-hour production week. Especially is this true in industries that have found themselves tied up without sufficient labor to get out their work in the normal 40-hour week.

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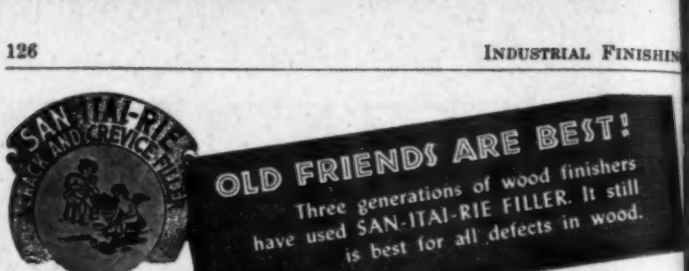
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position to run their production with maximum efficiency, due to the saving in the cost of heat. Instead of shutting off the heat at night, they can run on almost a 24-hour schedule by dividing the production crew into shifts and then placing reliable men in charge of operations. Since there is very little wear and tear apparent on most of the efficiently installed conveyors, the cost per article will not vary any more than your regular production.

Consider the mass shipments and the faster turnover possibilities, with the fact that your shipments will reach outlets faster and in larger quantities than your competitors', and it will all end in a surplus on the profit side for you. Also, you will have available a future force of men who have been given responsibility at night to keep production rolling. Some of them may turn out to be effective executive material for your expanding business.—N. N.

To prevent disastrous explosions, the concentration of solvent vapors in the atmosphere must be kept below their lower explosive limit by using equipment that minimizes the escape of vapor into the air, and by supplying a sufficient amount of fresh air by natural or mechanical ventilation.

Hazardous Cleaning

Attention has been directed by the National Board of Fire Underwriters to labels on products of paint, varnish and lacquer manu-

facturers, recommending use of gasoline and similar highly flammable liquids for cleaning surfaces prior to refinishing.

Current fire reports indicate that this method of cleaning is extremely hazardous. Opinion is expressed that the problem involves the entire country. Additional labeling legislation is being proposed. The National Paint, Varnish & Lacquer Association urges that each member of this industry check its labels and cooperate in discontinuing such directions to avoid, if possible, further demand for corrective legislation, or a multitude of varying local fire ordinances.

Are We Too Careless To Do Good Work?

Most Americans are so busy with their work they do not pay much attention to some of the things (conditions if you will) that are slowly but surely going on around them. This American trait is nothing new. It has been going on for a century or more. In the past we as a Nation have always pulled up sharp to collectively do something about it before it was too late. It is hoped that this facility for corrective action will continue .

Internationally, nationally and industrially speaking, these are very trying times. Recently the head of a large and successful manufacturing concern declared that, never before in the history of the business had he ever seen so much good material being spoiled by poor workmanship. His remark was not facetiously made. He was both thoughtful and serious. He was concerned over a situation for

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which he had no solution. It was and is a serious indictment.

It is also believed that this executive is not alone, except perhaps in his honesty in facing a serious condition now and admitting it. Isn't it high time that collectively we get rid of the "anything goes," "they'll buy anything," and the "don't care" attitude, and substitute pride in accomplishment and pride in product? The plan for greatness lies with each individual. The remedy lies with the men and women of industry. Let us do something about it before it is too late.—C. P.

Interchemical Elects Officers

Mr. D. R. Goldwaite, Chairman of the Board of Interchemical Corp., announces that Mr. Ernest W. Pittman had been elected to the newly created office of Chairman of the Executive Committee. Mr. Pittman has served as President of the Corporation since 1937.

At the same meeting Mr. Herbert B. Woodman was elected President. Mr. Woodman, formerly associated with the law firm of Cravath, Swaine & Moore, joined the Interchemical organization in 1936 and became Vice President and Secretary the following year. Mr. Pittman will continue to be fully active in the management of the Corporation.

New Canadian Plant for P. P. G. Co.

Construction of a new $1,000,000 factory at Long Branch, Ontario, on the outskirts of Toronto, Canada, is announced by E. D. Griffin, Vice President in charge of the Paint Division of the Pittsburgh Plate Glass Company. It will produce a complete line of paint, varnish and enamel products.

This plant is an addition to the present production facilities of The Murphy Paint Co., Ltd., in which the Pittsburgh company holds a substantial interest. Other Murphy plants are located at Montreal and Windsor.

Cut-to-Length Flock Offered

Behr-Manning Corp., Troy, N. Y., announces a complete line of cut-to-length rayon flock for industrial flock finishers. The new product is free-flowing, covers readily and yields a dense, uniform, velvet-like finish of unusually fine decorative and functional properties.

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Frank J. Soday Becomes Devoe Research Director

Mr. Frank J. Soday has been appointed Research Director at the Central Research and Product Development Laboratories of Devoe & Raynolds Co., Inc.

Mr. Soday's research and development work in organic chemistry has led to 100 patents being issued in his name, with applications pending on some 200 additional ones. These include developments in the production on some ethyl and isopropyl alcohol, acetone and similar industrial solvents as well as resins, plastics and synthetic rubbers with important practical applications in the protective coating, leather and textile finishing industries.

Frank J. Soday is appointed Research director for Devoe & Raynolds Co.

Damask linen tablecloths that can't be stained by gravy, and brightly-colored draperies that can be wiped clean with a damp cloth are among the postwar developments foreseen by Monsanto Chemical Co., as the outgrowth of its urgent wartime research into the plastic coating of fabrics.

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As sales representative for manufacturer of industrial finishing materials. 10 years' experience with well-known concerns. Very extensive knowledge of all phases instrumental in the manufacture and selling of wood and metal finishing materials. 35 years of age. Address IF-370, care Industrial Finishing.

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15 years' practical and executive experience, purchasing and inventory. Excellent on lay-out and all types of baking ovens. Trouble shooting on all metal finishes. At present employed in North East. Desire warmer climate. Salary $5,000. Address IF-368, care Industrial Finishing.

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General Manager, age 40, college graduate. I know how to run a business profitably and make it pay dividends. I have a good manufacturing background. Will take complete responsibility. Address IF-369, care Industrial Finishing.

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Brass. Experience in all types of finishing, buffing and rolling. Capable of assuming full responsibility. Exceptional opportunity. Metropolitan New Jersey. Address IF-371, care Industrial Finishing.

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Industrial Finishes. Experience helpful, but not necessary. We are making immediate deliveries on wrinkle finishes, hammered finishes, baking enamels, alkyd enamels for brush, spray and dipping. No objection to other non-conflicting lines. Territories in Penna., New England, New Jersey and Southern States. Commission basis. Address IF-359, care Industrial Finishing.

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1 SUPERINTENDENT AND 1 WORKING FOREMAN IN PAINT DEPARTMENT

We are manufacturers of metal furniture with factory located in Detroit area. Above positions will be available around May 15th. Approximately 25 employees in paint department. Knowledge of graining on steel sheets as well as paint-mixing desirable and must be accustomed to producing high quality finishes. Excellent opportunity for right men to grow with us. Salary and bonus arrangement. State qualifications. Address IF-373, care Industrial Finishing.

COATING FOREMAN

Experienced Foreman for Paper Coating Department of long-established manufacturer located upper New York state. Must have working knowledge of lacquers and other finishes and their application to paper by both continuous roll coating and spray coating. Splendid opportunity for right man. Give complete information in first letter as to age, experience and salary expected. Address IF-374, care Industrial Finishing.

FOREMAN WANTED

Charge of furniture manufacturing paint shop. Must be expert finisher and experienced supervisor. Plant located on Michigan lake shore in Wisconsin. Address IF-372, care Industrial Finishing.

STOPWATCHES

7 jewel. Used but perfect. Rate bargain at $10, check with order. Money back guarantee. Use for viscosity. GENERAL TEST EQUIPMENT CO., 38 Argyle, Buffalo 9, N. Y.

FOR SALE

15 drums Forbes Baking Primer, Dark Grey, 45c per gallon. RAND CHEMICAL PRODUCTS, 2335 S. Michigan Ave., Chicago 16, Ill.

FOR SALE

Opened 55-gal. drums of light blue and light green lacquer. Suitable for use in mixing darker colors. SPENGREY CAP CORP., 1107 S. Preston St., Louisville, Ky.

FOR SALE

150 gallons high quality furniture lacquer thinner; 45 M Venetian Blind slats, 16-in. long, 2¼-in. wide; 2 Acme Stapling machines, foot pedal type; various hand tackers and staplers. GENERAL WOOD WORKS, 105 S. 21st St., Council Bluffs, Iowa.

FOR SALE

1 gas-fired infra-red Burdett batch baking oven. Doors both ends. 14-ft. long, 7-ft. high, 6-ft. wide OA. Air mixture unit and recirculator equipment capable of handling an additional 14-ft. extension. Could easily be adapted for conveyor system. Price $3,000. Will consider reasonable offer. CALUMET FINISHING CO., 11575 S. Wabash Ave., Chicago 28, Ill. Phone COM. 7251.

SURPLUS STAINLESS STEEL TANKS

Only surplus makes such a remarkable tank value possible. A pure stainless steel tank, 9 gallon capacity, 12-in. diameter, 24-in. long. 18 gauge reinforced. All stainless steel. Internal pressure strength: 400-lbs. P. S. I. Tapped at both ends for ¾-in. pipe connections. 18-lbs. total weight. Thousands now in air compressor use. Rustproof, corrosion-proof; ideal for paint, lacquer or chemical containers. Prompt shipment while limited supply lasts. Only $8.00 each, fob Auburn, N. Y. IRELAND AND VICE, 48 Chedel Place, Auburn, N. Y.